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THE

CANADIAN AGRICULTURIST,

AND

Journal of the Board of Agriculture

OF

UPPER CANADA.

PUBLISHED MONTHLY,

AND DEVOTED TO

AGRICULTURE, HORTICULTURE, SCIENCE,

AND DOMESTIC ECONOMY.

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Erratum.—By an oversight the words "Vol. IX" have been printed in the heading of several numbers of this volume, instead of "Vol. X."

THE

Canadian Agriculturist.

VOL. X. TORONTO, JANUARY 1, 1858. No. 1.

THE AGRICULTURIST FOR 1858.

The *Agriculturist* has felt, and expects to feel the "hard times," in common with every other "institution" in the country. But we shall continue to urge, and as far as possible, lend our aid to effect improvement in agriculture,—increase of production, and decrease of cost,—as the chief, if not the only remedy, for the monetary evils that now afflict Canada. It is, perhaps, a good thing for agriculture, that the revulsion of prices occurred when it did. The minds of our farmers have been turned away from hazardous speculations, in which many of them had unwisely involved themselves, and they will now see that there is nothing so sure, so certain, so satisfactory in the end, as the *plough*. The profits of the farm are small, under ordinary circumstances, but where skill and industry have been moderately exercised, they are never converted into a *loss* that brings bankruptcy and ruin in a day. Not so with the merchant, the manufacturer, or the speculator. They may be wealthy, confident, flourishing to-day, and without a house or home that they can call their own to-morrow. A thousand cases could be cited in Canada alone, in which this sudden reverse has come upon persons belonging to the classes mentioned, within the last six months! Let us, then, "stick to the farm." Let us, instead of repining, take courage, and endeavour to *improve* the farm. Make it more productive; make it less expensive to work, by availing ourselves of every attainable improvement; and whether prices range high or low, we shall, at least, be tolerably free from the visits of the sheriff.

The *Agriculturist* will not, we think, prove less interesting or less useful this year than last. We have found it necessary to retrench a little, by reducing the number of pages, though the quantity of matter will be much the same. We have dropped the advertising pages, because we found they added considerably to the expense, without much profit. Many advertisers neither pay beforehand nor afterwards, and the amounts are too small to cover the cost of collection. A monthly paper cannot advertise profitably, without charging

three or four times as much as a daily or weekly. We shall briefly notice, editorially, for the benefit of our readers, any new article or improvement, or sale of stock, &c., which we may be requested to advertise.

The sheets of the Board of Agriculture's "Transactions" will be supplied to subscribers as fast as they are published, and delivered to us. New subscribers will not, we fear, be able to obtain the sheets already published.

The price of the *Agriculturist* is only *half a dollar*. Will not our friends make a special effort to increase its circulation? We are glad to announce that Professor Buckland has promised his valuable aid as a regular contributor this year. Other able correspondents will also assist to make the paper useful and interesting.

Agricultural Societies will be supplied as usual, but we await their orders.

WINTER BUTTER.

Butter made in winter is well known to be inferior to that which is produced during the other three seasons, especially summer and autumn. The difference is occasioned by a variety of causes, some of which, perhaps, it is not in the power of human ingenuity to remove. Much, however, may be done in the way of mitigation, and there is no good reason why butter made in the winter, should generally be, even in the extreme climate of this northern portion of the American continent, so deficient in colour and quality.

The quality of butter, no doubt, greatly depends upon the breeds of cows kept for dairying purposes. Those that are remarkable for early maturity and disposition to fatten, are seldom good milkers, to which class belongs a large number of Durhams and Herefords, although there are many animals among these distinguished breeds, as well as the Devons, that prove of first-rate excellence as dairy stock. The Ayrshire, and some of the smaller breeds of black cattle inhabiting the higher lands of Scotland, Wales, &c., (a few of which have recently been introduced into Canada, with apparent success) constitute, with judicious crossings with the best of our native breeds, as good a stock, perhaps, on the whole, for dairy purposes, as we are likely to obtain. The cross of our native cows, when judiciously selected with shorthorn, Hereford, or Devon bulls, not only produces animals of superior size, form, and feeding qualities, but often some of the best milkers. The Jersey cow, (commonly called the Alderney—a native of the Channel Islands betweeen England and France,) has long been distinguished as exceeding all others for the richness of her milk, and the quantity and quality of the butter. In England it is common to keep a cow or two of this breed among a herd of half a dozen or more, simply with the view of improving the quality of dairy products. A few have lately been introduced in the United States, with what results we have not seen stated. The Jersey cow is certainly a somewhat tender animal, and would not, we suspect, be very productive in our

cold Canadian winters, without, at least, the strictest attention to warmth and feeding. Besides the breed is small, and by no means plump and symmetrical, with no propensity to fatten under ordinary treatment. It is this latter circumstance that accounts, in great manner, for the peculiar richness of their milk.

The principal causes of the very inferior appearance and taste of winter butter, may be traced to the inferior food with which cows are fed during this season, the difficulty of keeping the dairy at a proper temperature, so as to enable the cream to separate freely from the milk, and thus to bring it into the most suitable condition for churning.

Cows are usually fed upon dry hay, with sometimes straw, which have comparatively little power of producing milk yielding good butter. A few roots such as carrots and parsnips, with a little mashed meal or bran, (the former cooked, and the whole given warm would be all the better,) in addition to hay or corn stalks, would be found to increase largely the supply of milk, yielding a far superior quality of butter. Turnips, as is well known, are apt to give the butter an unpleasant flavour, which, however, may be much mitigated, if not entirely overcome, by putting a small quantity of powdered saltpetre into the milk pail, previous to milking, provided the turnips are sound, and not given in too great quantities.

The great thing is too keep milch cows in as uniform temperature as possible, not too hot, and with a regular supply of fresh air ; fed regularly and uniformly, using warm mashes once a day ; allow plenty of pure water, and pay the strictest attention to cleanliness, both as respects the animals themselves, and the floor and bedding upon which they rest. Milking should be attended to with the strictest punctuality, both as to the time and the mode of performing the operation. To require that the dairy should be kept as clean as possible, and all its operations conducted systematically in the same spirit, with a moderate and uniform temperature, are conditions essential to success.

It is a too common practice in winter to keep the cream too long before churning, thereby occasioning great patience and difficulty in performing that operation. On the contrary, if the cream is made too warm, the butter becomes seriously injured both in colour and quality.

Cows properly selected, warmly housed, well fed with a variety of food, systematically attended to, both as regards cleanliness and milking ; a neatly conducted dairy of proper temperature, and in the coldest weather never heating the cream higher than 55°, or the most, 60° ; under these circumstances, the too oft-unwelcome task of churning will be completed at least within an hour, and butter larger in quantity to what we usually see in winter, will be the certain result.

THE QUANTITY of drain pipes made in England is said by the Builder to average forty miles a week! and of these, probably one-third are made in Lambeth.

NEW METHOD OF PRESERVING POTATOES.

It is well known that various expedients have been adopted of late years to preserve potatoes in a sound and wholesome state for cooking, but without any result that can be said to be completely successful. As the disease appears to be quite as prevalent in Europe the present season, as it is here in Canada, and over a large area of this continent, any easy, practicable method that can be devised of preserving the comparatively sound tubers for future use, must be regarded as an object of general interest and importance.

It is stated upon good authority that Mons. Chollet, the celebrated Paris manufacturer of compressed vegetables and preserved meats, has been so successful in applying Masson's patent to the potatoe, as to leave nothing to be desired.

Professor Lindley, in a recent number of the *Gardener's Chronicle* observes :— "Before expressing an opinion on the subject, we have thought it right to give the preparation a fair trial ; it has now been in daily use with one of us for some time, and we think no one could possibly tell that the mashed potatoes, when brought to table, were otherwise than prepared from fresh tubers. Perhaps, in taste. they resemble roasted potatoes, more than boiled ones; a merit, undoubtedly, not a defect. The preparation may be kept in canisters, with a perfect certainty of there being no waste, nor any chance of deterioration."

"The present price of potatoes in Covent Garden Market, of the best quality, is about £7 a ton. One ton of prepared potatoes is equal to four tons raw ; if then, as we understand, the manufacturers offer their preparation at £25 10s. a ton, wholesale, it is obvious that it is £2 10s. a ton cheaper than the raw material, besides which it is liable to no waste, or loss otherwise."

The mode of preparing the potatoes for table is very simple, and may be thus briefly stated : Put one pound of them into a saucepan, and pour about three pints of boiling water on them ; cover the saucepan (to prevent cooling) for a quarter of an hour, then add salt, &c. ; mash well ; this will make about four pounds of excellent mashed potatoes.

If this method should be found, upon further trial, to answer the expectations now excited in regard to its present state of progress, there can be no doubt but it will be very extensively practised. The labour and risk incident to the storing of potatoes, especially in so severe a climate as ours, are so great, that should this plan prove generally practicable, it will effect no small saving in national, as well as domestic economy. In unfavourable seasons, a large amount of tubers, in an incipient state of disease, might thus be converted into nutritious food, and preserved for an indefinite period. As the price of potatoes has, of late years, ranged quite as high, (probably, in some instances, considerably higher) on this side the Atlantic, than on the other, this discovery promises an equal benefit to America and Europe.

Those who excell in strength are not most likely to show contempt of weakness. A man does not despise the weakness of a child.

THE IMPORTANCE OF AGRICULTURE.

BY HON. EDWARD EVERETT.

There is a temptation, when men assemble on occasions of this kind, to exaggerate the importance of the pursuit in which they are engaged, in comparison with the other callings of life. When farmers, or merchants, or manufacturers, or teachers, or professional men, come together, to celebrate an anniversary, or an important event, or to do honor to some distinguished individual, it is almost a matter of course that their particular occupation or profession should be represented by those on whom the duty of speaking for their associates devolves as the most important profession or calling. No great harm is done by these rhetorical exaggerations, which in the long run, must correct each other; and which, if they have the effect of making men more content with their own pursuit, are not very pernicious, even if they remained uncorrected.

Although these claims which men set up, each for the paramount importance of his own occupation, cannot of course be all well-founded, it may be maintained that each of the great pursuits of life is indispensable to the prosperity of all the rest. Without agriculture and manufactures, the merchant would have nothing to transport or exchange. Without commerce, the farmer and the manufacturer would be confined to a barter trade, in a limited home circle of demand and supply. In this respect, all the great pursuits of life in a civilized community may be deemed of equal importance, because they have each and all for their object to supply some one of the great wants of our nature; because each is necessary, to some extent at least, to the prosperity of every other; and because they are all brought by the natural sympathies of our being into a harmonious system, and form that noble and beautiful whole which we call civilized society.

But without derogating from the importance of any of the other pursuits and occupations, we may safely, I think, claim for agriculture in some respects a certain precedence before them all. It has been said to be the great and final object of government to get twelve impartial and intelligent men into the jury-box; by which of course, is meant that the administration of equal justice between man and man is the primary object of civilized and social life. But the teacher, secular or spiritual, might plausibly urge that it is of prior importance that the community should have the elements, at least, of mental and moral culture, and be taught the obligations of an oath, before any twelve of its members should take part in the administration of justice. The physician might contend that health is of greater importance than the trial by jury; and with greater reason it might be claimed for agriculture that it supplies the first want of our nature; the daily call of the great family of man for his daily bread—the call that must be answered before the work of life, high or low, can begin. Plaintiff and defendant, judge and jury, must break their fast before they meet in court; and, if the word of a witty poet can be taken, certain very important consequences sometimes happen to culprits, in order that jurymen may get their dinner.

But, to speak in a more fitting and serious strain, I must confess that there has always seemed to me something approaching the sublime in this view of agriculture, which (such is the effect of familiarity) does not produce an impression on our minds in proportion to the grandeur of the idea. We seem, on the contrary, to take for granted, that we live by a kind of mechanical necessity, and that our frames are like watches made, if such a thing were possible, to go without winding up, in virtue of some innate principle of subsistence independent of our wills, which is indeed in other respects true. But it is not less true that our existence, as individuals or communities, must be kept up by a daily supply of food, directly or indirectly furnished by agriculture; and that, if this supply should wholly fail for ten days, all this multitudinous, striving, ambitious humanity, these nations and kindreds and tribes of men, would perish from the face of the earth, by the most ghastly form of dissolution. Strike out of existence at once ten days' supply of eight or ten articles, such as Indian corn, wheat, rye, potatoes, rice, millet, the date, the banana, and the bread-fruit, with a half-dozen others which serve as the forage of the domestic animals, and the human race would be extinct. The houses we inhabit, the monuments we erect, the trees we plant, stand in some cases for ages; but our own frames—the stout limbs, the skilful hands that build the houses and set up the monuments and plant the trees—have to be built up, recreated, every day; and this must be done from the fruits of the earth gathered from Agriculture. Everything else is luxury, convenience, comfort—food is indispensable.

Then consider the bewildering extent of this daily demand and supply, which you will allow me to place before you in a somewhat coarse mechanical illustration. The human

race is usually estimated at about one thousand millions of individuals. If the sustenance of a portion of these multitudinous millions is derived from other sources than Agriculture,this circumstance is balanced by the fact that there is a great deal of agricultural produce raised in excess of the total demand for food. Let, then, the thoughtful husbandman, who desires to form a just idea of the importance of his pursuit, reflect, when he gathers his little flock about him to partake the morning's meal, that one thousand millions of fellow-men have awakened from sleep that morning craving their daily bread with the same appetite which reigns at his family board ; and that if, by a superior power, they could be gathered together at the same hour for the same meal, they would fill both sides of five tables reaching all round the globe where it is broadest, seated side by side, and allowing eighteen inches to each individual ; and that these tables are to be renewed twice or thrice every day. Then let him consider that, in addition to the food of the human race, that of all the humble partners of man's toil—the lower animals—is to be provided in like manner. These all wait upon Agriculture, as the Agent of that Providence which giveth them their meat in due season ; and they probably consume in the aggregate an equal amount of produce ; and finally, let him add in imagination to this untold amount of daily food for man and beast the various articles which are furnished directly or indirectly from the soil for building materials, furniture, clothing and fuel.

The grand total will illustrate the primary importance of agriculture, considered as the steward—the commissary—charged with supplying this almost inconceivable daily demand of the human race and the subject animals for their daily bread ; a want so imperative and uncompromising, that death in its most agonizing form is the penalty of a failure in the supply.

But although agriculture is clothed with an importance which rests upon the primitive constitution of our nature, it is very far from being the simple concern we are apt to think it. On the contrary, there is no pursuit in life which not only admits, but requires, for its full development, more of the resources of science and art,—none which would better repay the pains bestowed upon an appropriate education. There is I believe no exaggeration in stating that as great amount and variety of scientific, physical, and mechanical knowledge is required for the most successful conduct of the various operations of husbandry, as for any of the arts, trades, or professions I conceive, therefore, that the Legislature and the citizens of the great State over which you, Sir, (Governor King,) so worthily preside, have acted most wisely in making provision for the establishment of an institution expressly for agricultural education. There is a demand for systematic scientific instruction, from the very first steps we take, not in the play-farming of gentlemen of leisure, but in the pursuit of husbandry as the serious business of life.

THE LATE SMITHFIELD FAT CATTLE SHOW.

We condense the following items from the *Mark Lane Express*:—

We give the following figures, stating in the closest form which breeds have come up in unwonted force, and which of the new classes have contributed most to the increase of our present show. The entries were :—

	1855.	1856.	1857.
Devons	17	21	32
Herefords	20	21	36
Shorthorns	40	42	43
Scotch, Irish,and Welsh	16	13	18
Other pure breeds	3	18	22
Cross bred	7	12	8
Extra	9	13	17
Total	112	140	176

An increase, it appears, of one-third, both in the Hereford and Devon classes, has been the principal item in swelling thecatalogue and filling the show-yard, though the Shorthorns still remain a long way ahead of the other breeds. The total number of cattle is very much greater than on any other occasion.

As to excellence, we have no hesitation in pronouncing this exhibition the best ever collected together in Baker street Bazaar. Class after class presented an array of animals of remarkably high character, with rarely an inferior beast ; and, as we might anticipate from the extension of good breeding of late years, the quality is almost universally of a superior

dsecription, and the huge monstrosities of fat once wondered at and ridiculed have given place to animals of a more profitably-feeding, early fattening, and valuable kind. The standard of merit is not now simply the amount of flesh, except in the jugdment of some old-school authorities; but the symmetry, quality, and valuable characteristics of the animal are taken into consideration, notwithstanding the circumstance of this Show being purposely designed for fat stock intended for the butcher. And we trust this principle will be persevered in—namely, to encourage such a fatness as may indicate the profitable nature of a bre-d, rather than mere weight, regardless of expense and time wasted in its attainment.

As to individual merit, we must own that, while the universal excellence proves how our various breeds are progressing, instead of deteriorating, the two best animals in the yard cannot be set up as nobler and more magnificent specimens than were ever seen before. If we were to compare the gold medal ox or cow this year with those of many years back, we should undoubtedly find that a great advance has been made; but to expect that every year's prize animal is absolutely to eclipse the preceding one, is to consider breeding as purely mechanical. Whereas nature bestows her gifts of form and beauty, and constitution and kindly habit, capriciously, as far as world-renowned marvels of excellence are concerned, and sometimes only at rare intervals gives us a Master Butterfly or a Durham Ox. Hence the relative merit of individual animals from one year to another is of less importance than the amount of improvment or otherwise marking an entire class, or, indeed, a whole show. And, of course, the larger the number of first-class animals bred, the greater the chance of obtaining an ox more perfect and astonishing than the world has yet seen.

The prize Shorthorn ox will remind many persons of the famous Durham ox, and is remotely descended, we believe, from Earl Spencer's celebrated stock. What an extraordinary length and breadth, and yet most beautiful symmetry and compactness of form; his chine and ribs most wonderfully expanded, his immense weight of flesh most evenly laid on, and of first class quality; and his head and and bone fine, and very handsome. The only deficiency appears in his thigh and twist, which might have been better in proportion. His measurement is extraordinary, the girth being no less than nine feet two inches, and the length nearly six feet. Now that Mr Wortley has made such a glorious *debut* at Baker street, winning golden opinions with his real golden honours, and also, in addition, a third prize for his Shorthorn cow, likewise of his own breeding, we hope to welcome him in future as an annually successful competitor.

Last year the Shorthorns were obliged to yield one of the gold medals to Mr. Heath's superb Devon; but the year before, they carried off both, just as on the present occasion. Colonel Towneley's splendid cow, four years and one month old, and having had one calf, is far before any other animal in her exceedingly good class, and is, indeed, one of the finest we ever saw; not, however, for an immense frame or an extravagant degree of over fatness, but because of her level and regular feeding, her unsurpassed touch and quality of meat, united to a faultless symmetry, beauty, and fine offal, and neat head. But the visitors to Salisbury, York, Birmingham and elsewhere, know her so well that we need not extend our expression of admiration. We would only add, that if any proof were wanted of the importance of fat stock shows, it is here in the fact that an animal of the very purest and best bre-d has won the day against all others, in the production of the largest quantity of most valuable beef. But is she a *bona fide* fat animal for the butcher? Or will she be taken home, and, if possible, again use- as a breeding cow? Colonel Towneley also gains a second prize for an exceedingly good steer in the cross or mixed-breed class; this steer and the cow being the only animals exhibited by him.

The show of Shorthorns, as a whole, was very satisfactory; and we particularly admired the class for steers or oxen above three years old, comprising some especially good animals and the class of cows which contained some amazingly good and meritorious. Yet it will be observed in the lists of awards that the judges have given the Shorthorns little more encouragement or approval than they were compelled to to administer, only two commendations being accorded—one to Lord Southampton's ox, and the other to Mr. Garne's white cow. The latter is very handsome, very fat, and had she been less patchy, and with more meat on her neck, would have been entitled to a prize.

Mice and Trees.—Some unthinking individuals are apt to throw straw or coarse manure around fruit trees to protect them during the winter. The straw makes a first rate protection for mice, where they can gnaw the trees at their leasure under the most comfortable conditions. It is better to either stamp down the snow very solid arouud trees or to scrape it away altogether, when injury is feared from mice.

IMPROVEMENT IN THE BREED OF HORSES.

In former articles we have shown or endeavoured to show, a few of the general principles of horse-breeding; the advantages resulting from breeding to pure blood on the sire's side, whatever the quality of the dam; the points of the symmetry and strength most desirable, and, indeed necessary to the parents on both sides, and on which side more particularly; the necessity for perfect structural and constitutional soundness and health, on both sides, and for the absence of hereditary vice of temper; and, lastly, the state of health to be aimed at in the dam, as well previous to her being taken to the horse as during the period of her gestation, and the means to be taken to obtain and preserve that condition of health, or, as it is usually termed among horsemen, *condition*, emphatically. We shall now proceed to show a little more particularly what are the improvements to be obtained in different varieties, and how this improvement is to be produced; for it is very certain that the same horse will not answer for every kind of mare, but that, on the contrary, for very different styles of dams different sires will be required to produce equal results in the progeny. Now, it may be stated generally that the ordinary objects of breeding-up are twofold. One, and the most common and most feasible, is from an entirely cold stock, we will say, for example, the Cleveland Bay, or the nearest approaches to be found to it in this country, the Conestoga cart mare, namely, or the larger Vermont draught mare. We do not speak in this connection of the Morgan, or the Canadian, or the Norman—some mares of which last stock have been recently imported into this country—since all of these have some strains, more or lest distant, of thorough blood,—to raise a progeny improved in spirit, speed, lightness of action, endurance of fatigue and courage, by stinting mares of that stock to blood horses. This is the simplest of all the ends to be attained, and can be almost certainly accomplished, by sending the mare—taking it for granted that she is sound and generally well formed—to any thorough-bred horse, provided he also is sound, well shaped and free from vice. Any such horse will, more or less, improve the progeny, both in blood and in the form, structure and strength of the bones, both in frame and spirit, without any especial reference to the particular strain of thorough blood from which he himself comes, so that the strain be not tainted with hereditary disease. In the second, and third, and yet more in later generations, when blood has been introduced and the dams as well as the sires have some mixture of a pure lineage, it is more requisite to look to families, since some families notoriously cross well with others, and some as notoriously ill. Of course, it is better that the sire, where it is possible, should be of a racing stock that is famous for courage and stoutness, such as any of the stock which trace remotely to Herod, Cade, Regulus, Eclipse, or others of known fame; but thus far it is not essential, or a *sine qua non*, since every blood horse, even if—as Sir John Fenwick said in the reign of Charles II—he be the meanest hack that ever came out of Barbary, is so infinitely superior in courage, stoutness and quality, both of bone and sinew, as well as blood, to the best cold-blooded-mare that ever went on a shodden hoof, that he cannot fail to improve her stock, whatever may be his comparative standing among racers. All therefore, that the breeder has to do in this instance is to satisfy himself that the horse is *really thorough-bred*—that is to say, traceable on both sides of his pedigree to English stud-book race-horses—and that he has the virtues and has not the defects of form which have been previously subjects of discussion. Next to this there must be an harmony in the size, and, to some extent, in the forms of the animals. The putting small mares to gigantic horses, or colossal mares to ponies, in order to give size to the offspring, will never answer, but on the contrary will result in the production of rickety, malformed produce. The mare as it has been said may be with advantage something larger, longer and more roomy than the horse, but not too much so. We should say a mare of sixteen hands and proportionate strength should never be put to a stallion under fifteen hands, and from that up to fifteen and one inch; nor a mare over sixteen hands to one short of fifteen and a half, up to sixteen hands three. Still less should little mares be put to tall horses, or low mares to leggy horses, in order to give height. If the brood mare be low, but long and roomy, it is no bad fault; but the way to give size to the progeny is to select, not a tall or leggy horse for the stallion, but one of singularly perfect symmetry, not much higher than the dam, though an inch or two inches will do no harm, provided he be not long in the legs, especially from the knee downward, short backed, close coupled, and generally strong built—particularly so in those points where the mare is too much defective. We stated above that there is no greater blunder than to breed from an animal rickety and defective in one point to another perfect in that point or even unduly developed in it, with the expectation of curing both defects in the progeny. This rule, however, is to be understood with some margin. That is to say, it is to be held absolute only where the defect in the mare or the horse is so

great that it is imprudent to breed from either at all. One often, however, sees both mare and horses with some one or more faults in symmetry which are positive defects, although only in a secondary degree, and which are at the same time counterbalanced by so great a number of positive advantages, excellence and beauties, that he is wise to waive the one defect striving to remedy it, in view to the other good to be hoped for from the strain. Now it of course follows, that if one breed from parents, each of whom is in a degree faulty in one and the same point, he is more likely to have an offspring faulty in the same point, than if he breed from one which is in a degree faulty and the other excellent. Therefore, no one in his senses would doubt that, if his mare was slightly too long in the leg, or too light of bone, somewhat too long in the back, too loose in the loins, or too narrow in the chest, he shonld choose a stallion to which to put her as strong and as perfect as possible in those parts which in the mare are blamable. The transmission of external shapes is as yet a mystery, and probably ever will continue so. No one can say whether the stallion or the mare has the greater share in giving structural form or constitutional dispositon to the young animal. Indeed, there seems reason to believe that there is not an invariable rule on the subject; but that some dams and some sires possess an extraordinary power of impressing their own forms and stamping their own images, in the greater degree, on the young. The general rule, however, and that which it is wise to observe is that *like begets like*. Therefore, the practice should be always, where one desires to breed from a mare slightly defective in one point, or more than one, of symmetry, to select a stallion as excellent as possible in that defective point, and if one be resolved for any cause to breed from a stallion of whose blood, or beauty, or performance he is particularly enamoured, and that horse be weak in any point or points, to put to him whatever mare one may have in his stud most excellent, where he is weakest; but in no case, even if it prohibit one from breeding from that horse at all, to put him to a mare which is faulty in the same part. The second ordinary object of breeding-up is, where mares of some highly valued strain, possessing some degree of pure blood engrafted on an inferior stock, have degenerated in size, in height, strength and size of bone, to breed them to such horses as shall, without deteriorating their blood, improve them in size and bone. This is a far more difficult question in breeding, and before it can be answered it will be necessary to know of what blood is the impure portion constituted, and in what proportion does it exist. If it be distinctly of cold blood, as of Cleveland Bay, Suffolk Reach, Conestoga, or common cart-horse, and if the proportion of thorough blood mixed with it be inconsiderable, it may at once be pronounced useless to take any pains about it, as the results will not, it is a thousand to one, repay the trouble or expense. If the proportion of pure blood be considerable, but remote, and the stock have been long *in bred*—as, for example, is the case with the Morgans—the only possible way to breed them up is to stint the mares to the very best and most powerfully made short coupled, broad chested, strong loined, short legged, thorough bred stallions that can be found, of a totally distinct recent strain of blood, if the blood of the mares can be ascertained, although it will not be the worse if some ten or more generations back, they both run into the same line. In this case the stallion, in the first cross, should not be taller or larger than the mare, except in strength, size of bones and muscular development. The fillies in the second generation will be larger in all ways than their dams—since improvement of strength, health, symmetry and development implies improvement in size. These fillies may be again put to horses of exactly the same stamp as that last described, but just so much larger than her dam. This will in all probability achieve the desired end. This is in fact what is known among breeders as breeding-up, in the true sense of the word. If, on the other hand, the mares, degenerated, have been crossed with pure English blood, but remotely and not recently, on Canadian or imported Norman stock, there will be no objection to crossing them back once to Canadian or Norman stallions; and the breeding back will often in that case so far re-invigorate the race that the fillies produced by that union will often reproduce animals of astonishing excellence by a farther cross with well-chosen thorough blood of the present day. In a future paper we shall explain what is meant by avoiding in-breeding continually to the same blood, yet breeding back to it, after a lapse of years with beneficial effect.—*New York Tribune.*

A New English Apple. A seedling raised from the Newtown Pippin of the United States has been raised in England, and called the Harrison Pippin. The *Gardeners Chronicle* states that it resembles the London Pippin, and is somewhat similar to the White Calville in quality. It has a clear, warm, greenish-yellow skin, freckled with russet, and delicately tinted with red next the stem. It attracts much attention in the fruit stores.

THE AMERICAN EAGLE REAPING AND MOWING MACHINE.

It will be pleasing to many of our readers, to learn from the extract given below, from the *Farmer's Magazine*, the marked approbation by the farmers of England, of the Eagle Reaping and Mowing Machine, a recent American invention :—

The trial of the reaping and mowing machines resulted in bringing out what was undoubtedly the principal novelty of the show—namely, the American Eagle Reaping and Mowing Machine. This is the invention of A. A. Caryl, of Sandusky, Ohio, and was exhibited by the English agent, Mr. H. Clayton, of the Atlas Works, Dorset square, London. This machine took the first prize as a grass-mower ; and from the simplicity of its moving parts, its light draught, and easy adjustment in overcoming obstacles, it attracted great attention. The framing is carried by bearings upon the axle of the main carriage wheel ; preceding which the pole is placed, while the driver sits behind. By this arrangement the whole is balanced, so that no more weight bears on the neck of the draught-horses than is necessary to steady the movement ; and by merely pressing with his foot on the hind part of the framing, the driver, with amazingly little exertion, is able to raise the cutter a height, if necessary, equal to eight inches—thus overcoming all obstacles, and clearing the furrows. The principal features, however, are the driving and cutting apparatus. This machine has virtually a double set of cutters, the upper ones reciprocating at a much slower rate than is usual in other machines, while the under ones are stationary, and, projecting an inch beyond the line of the upper ones, act at once as guards and cutters. All the blades, both of the upper and lower series, are independent of each other, and each is connected with the bar by a screw-bolt. This arrangement enables a broken or disabled blade to be easily removed, and a perfect one substituted. The upper blades are held down by a spring pressure bar, so that the operation is similar to that of shears, the grass being cut between two edges. The cutting blades are made of iron at the back, and the front or cutting-edges of the best cast-steel. The iron giving strength, the steel can be made as hard as desired. The driving gear is amazingly simple, and contrasts favourably with that of other machines, there being an entire absence of all toothed gearing ; a cam, fixed to the end of the cutter-bar, and a series of curved slides in the main wheel, in which the cam works, being substituted. It is difficult, without the aid of drawings, to give an idea of the movement.

If the reader will imagine the periphery or tire of the main wheel to have a series of curved apertures cut in it, of equal size, and at equal distances, these apertures being connected with each other by narrow cuttings, thus forming a species of sinuous path round the entire circumference of the wheel—and further, if he will suppose the cam of the cutter-bar inserted in this path—he will form some idea as to how, by the passage of the cam from the small cut to the large curved aperture, and from the latter to the former alternately, the cam will receive a series of jerks, alternately from side to side, which will thus impart a reciprocatory motion to the cutter bar, to which it is attached. From the nature of the movement, doubts are apt to arise as to its ultimate economy. Certainly nothing but first-class workmanship will stand the severe test of the mode of operation. As a grass-mowing machine, all who have seen it in operation think it of first-rate excellence, and that it supplies a desideratum long felt in haymaking operations. It is right to state that, in addition to the first prize at the Salisbury Show, it obtained the $1,000 prize in 1856, after a three days' trial, at the Massachusetts Society for the Promotion of Agriculture, U. S.

Feeding Horses.—Your remarks in relation to the amount of hay and grain, which a horse will consume per day, have attracted my attention. The actual amount of food consumed by a horse, will depend upon his form and disposition. I have found that horses of a compact form and quiet disposition, weighing about 1,200 pounds, and exerting a force equivalent to moving 150 or 200 lbs., at the rate of two miles per hour, for 10 hours per day, and six days in the week, will require each twenty pounds of oats, fourteen pounds of hay, and seventy pounds of water, with a comfortable stable, to keep them in good order. Much depends upon the horse having a keeper who knows how to use him without harshness. —*Cor. Mich. Farmer.*

A celebrated Morello cherry tree, supposed to have been planted in the time of Henry the Eighth, at Whalley Abbey in Lancashire, died during the past summer. Its height was ninety feet. Even the mistletoe sought its mighty shadow in one of the places where it was most appropriate.

THE VALUE OF AGRICULTURAL SHOWS.

We copy the extract given below from an article in the *Farmer's Magazine*, entitled "Notes on Novelties at the Agricultural Shows of 1857," by Robert Scott Burn :—

"All improvement is progressive ; the feeble attempts of infancy but tend to cultivate the habits, and enlarge the faculties which lend strength and vigour to maturer life ; and the tiny Shows of bygone years, which but afforded lounging places to an indifferent public, or an opportunity for the incredulous and the 'slow' to indulge in sneers at 'new-fangled notions and graceless innovation'—each gathering fresh experience from its predecessor—have resulted in those gigantic combinations, which alike please from their novelty, and teach lessons of practical worth from their utility, and of which that recently displayed at Salisbury has been the most remarkable. Nor although the last few years have witnessed such marvellous strides towards perfection—of which each succeeding show has been the exponent—need we look forward to our speedily arriving at the culminating point ; with such a wondrously expansive science as that of Agriculture, we still progress towards a point which each year may to us seem like perfection, but which experience shows us is as far off as ever. Much has been written and more has been said about the uselessness of these shows ; but while freely admitting that there may be, and is much to reform connected with them—that the *prize system*, to wit, may cause merely spasmodic efforts, which have the appearance of life, but are in reality dead ; and that the *implement trials* might, with benefit, be made to have as much reality as they now have of name, and of real work and less of play about them—still we think that the services rendered to the cause of agricultural progress, by the holding of stated agricultural shows, have been neither few nor unimportant. They may be termed bazaars merely ; but granting they are this, and 'nothing more,' in bringing men to them we enlarge their ideas ; we rub the rust off them by contact with other material ; and truly he who rubs shoulders with his fellow men in the world's busy marts, has a better chance of becoming world-wise, and 'getting up to a thing or two' likely to be of use to him, than he who sits at home 'contented wi' little,' but with an unfortunate indifferrence to the possession of 'mair.' And surely he has little chance of getting in a good stock of the *newest* and the *best* of articles, who sneers at the utility of going to a full market, but puts up at the nearest huckster's shop. We can scarcely conceive of the dullest fellow who ever trod in 'how-low' or sported 'smock,' walking through the alleys of an agricultural show without having some new thought awakened, or some slight desire to know what it was all about. And the slowest farmer might well be inclined to ask if none of the implements he stood gazing at, could be of use to him, and whether he could raise and rear such mighty cattle, or such gigantic sheep, as rouse his wonder. For spreading knowledge, it is a great matter to rouse curiosity and incite to inquiry. Our shows have done this good—the amount of which it is difficult to estimate—they have roused curiosity and stimulated inquiry. If they have not taken the high position and assumed the positive usefulness of a guide-book, which points out the pleasant spots on the road to be visited, or the dangers to be avoided, they have at least acted as finger posts to indicate the direction in which the traveler may quickest and most economically arrive at his destination. And this, though apparently a humble, is in reality—we perpetrate no pun, good reader—an exalted position to occupy."

A Trap for Catching Sheep Killing Dogs.—Make a pen of fence rails, beginning with four, so as to have it square, and as you build it, draw in each rail as you would the sticks of a partridge trap, until your pen is of sufficient height, say five feet. In this way you will construct a pen that, when finished, will permit a dog to enter at the top at pleasure, but out of which he will find it difficult to escape, should he have the agility of an antelope. All that you have to do to catch the dog that has killed your sheep, is to construct the trap, where a dead sheep is left, as directed, as soon as possible after an attack has been made on your flock, put a part or the whole of a sheep that has been killed, in it, and remove the balance to some other field. In a majority of cases the rogue and murderer will return the succeeding night, or perhaps the next, and you will have the gratification next morning of finding him securely imprisoned. Some may object to the plan, perhaps, on the ground that you might catch an innocent dog, If so, he can content himself with not trying it. For my own part, I should pronounce the sentence of guilt on any dog caught on *my farm* within three nights after my sheep had been killed, and execute the law speedily, without any qualms of conscience.—*Southern Planter.*

VETERINARY SCHOOL.

(*To the Editor of the Agriculturist.*)

In the midst of our political and party turmoil, it is pleasant to note the progress of Canada in agricultural improvement, and I hesitate not to ascribe a very considerable portion of the happy results of this progress to your literary labours.

In a young country, agriculture must necessarily have much to learn; but it is some encouragement to reflect that our farmers are tolerably untinctured with hereditary prejudices, and are, for the most part, reasonably disposed *to go a-head*, when they think it is in a right direction.

I have no intention, at present, of entering upon the *mare magnum* of arable husbandry, but will content myself with offering a few remarks upon the Live Stock department, more especially when labouring under the consequences of accident or disease. No man knows better than you, or more highly appreciates the praiseworthy and successful efforts of such men as Stone, Wade, and their confreres, in improving our cattle; and when I look at the *grade* productions upon my own farm, the dams being common low-priced cows, and remember that I have sent out some forty or fifty thoroughbred Durham bulls to various parts of the Province, I am not over sanguine in assuming a considerable improvement in the common herds of the country. *One* rule should be *rigidly* adhered to, in fact should be considered as a law of the *Medes and Persians—upon no account to make use of any other* than a *pure* Durham bull, with an unexceptionable pedigree both in *sire* and *dam*. This rule ought to be applied to all breeds, *Durhams*, *Devons*, &c., and will be relaxed of course, as regards the female according to circumstances. When a bull of a totally different, or of a *mixed* breed, is used, no breeder can have any certainty whatever, of what the produce may be. I saw a cow in the herd of the late Mr. Bates, which exhibited some points, certainly not to have been looked for in his herd. Mr. B. was perfectly aware of the blemish, and told me it was clearly deducible from what he called the "*alloy*" on the Galloway blood, at one time infused, by the Messrs. Colling, into their well-known herd. It had descended through, probably thirty generations.

Our cattle have, in times past, been miserably neglected; even as regards the ordinary provision of food and shelter; under accident or disease, their treatment has been barbarous and disgraceful in the extreme. The establishment and distribution of well-educated men, as veterinary practitioners, throughout the Province, is a boon breeders cannot too highly appreciate, and which, I verily believe, requires little more than organization to attain.

It is no long period since Scotland was quite as destitute in this respect as Canada is now, and Scotland can now boast of a veterinary school, probably unrivalled in Britain, attended by young men from all parts of the world; issuing diplomas, which are accepted at the Horse Guards, and supplying scientifically educated blacksmiths to all parts of the country. It may be

asked, "How did this happy result come about?" Truly we may say "*ex parvula scintilla, &c.*" The late Dr. Barclay, of Edinburgh, so well known as a teacher of comparative anatomy, had an excellent habit, after lecture, of discussing the subject day by day, with his students, of whom the writer was one. A large proportion of his students were classically educated young men, then preparing to take their medical degree, and who rather winced under the shrewdness and intelligence displayed at such times, by a young man (William Dick) attending the class. This young man, in a modest and unpretending manner, often put them to the blush, and at last led them to ask the Doctor if he knew who the young man was, upon whom he daily lavished his commendations. The doctor having declared that he knew nothing about him, was quickly told that he was a common, working blacksmith. "Well, well," says the Doctor, "all I can say is, that *whether he be blacksmith or whitesmith, he's the cleverest chap among you.*"

Dr. B. and the writer, being both at the time, Directors of the Highland Society of Scotland, induced the Board to interest themselves, and the veterinary school was soon established. Various parishes sent up young men for education, who found an engagement for their spare hours at Mr. Dick's, or other forges in town. The medical professors and lecturers supplied them with free tickets to their classes, and what was perhaps of at least equal benefit, attended most anxiously at the examinations, when diplomas and certificates were to be issued to the students who were found to merit such distinctions. Truly, these examinations were no sham; often has the writer, in company with many others, marvelled at the acquirements which raw country lads had made.

The Edinburgh Veterinary School has prospered, and has become a sort of University, having a regular staff of Professors and Demonstrators, all highly qualified men, and who, by dividing the curriculum, essentially facilitate and expedite the progress of the students. Mr. Dick, of course, continues at the head of the Institution, and had, indeed, much reason to be satisfied with the fruits of his talents and labours. Mr. D. has many good qualities as a teacher, none more remarkable than his power of attaching and inspiriting the students. Many are the consultations and communications which reach him from the young men, when established in their homes. Of these, many were painfully, though ludicrously, illustrative of the low ebb of veterinary knowledge around them. Perhaps one or two examples may be acceptable. One pupil writes:—"I was lately called to a poor ox, labouring under hopeless constipation. I at once pronounced the case to be desperate, and took my leave. The owner, loth to lose his ox, called in the old farrier or leech of the district. A cure was now *confidently promised.* A lively trout (*risum teneatis*) was taken from an adjoining stream, and committed to the gullet of the patient, under the assurance that it would soon work its way through all impediments, and speedy relief be afforded. Of course, nothing more was seen of the trout; the poor ox died, and the *Edinburgh doctor* receiv-

ed all the credit of the failure, from his *previous* mismanagement of the case."

Another student writes : "A few days after my arrival at home, I was sent for, in violent haste, to attend a three year old colt, which had been castrated about six hours before. The artery was bleeding in full stream, the stall deluged with blood, and the owner and family all looking as pale as if the case had been desperate. The animal had been several times cast and fired, and the cord so shortened, as to be, with some difficulty, brought outside of the scrotum. The operation had completely failed. I had the colt thrown again, and told them there was no danger, and that all would soon be right. The only answer I got was, "Nothing frightens you doctors, there can be no chance of recovery." I seized the cord without difficulty, and guided by my acquaintance with the anatomy of the parts, I caught the artery with the forceps, applied the ligature, stopped the bleeding, astonished the neighbours, who had crowded in to see the poor beast die, and went away loaded with blessings, for the simplicity and success of the operation."

I know not whether the breeders and farmers of Canada will feel as zealous as I do upon the subject. Petitions for aid and advice should flow in from all agricultural societies to the Bureau and Board of Agriculture. The thing *may* be very easily done, and in a few years every part of Canada may possess intelligent and well educated veterinarians and men who will shoe our horses in a proper way.

The school may in some way be controlled by the Bureau and Board, and perhaps form a rider to the agricultural class. I am not sure, also, in such a Province as Canada, whether medical men, who must expect in many cases to be established in rural districts, would not find veterinary science of some importance, and whether they might not find that a successful treatment of a valuable mare or a prize cow, might not prove as valuable an introduction to a farmer, as the best they could do for any biped in the household.

If you approve of this suggestion, I trust you will forward its accomplishment by all the means in your power. There can be no doubt, that it would prove equally useful and creditable to Canada.

I observe that our neighbours in the States are engaged with a similar enterprize, and I only wonder with their splendid horses, herds, and flocks, that they have not sooner carried it into operation. Pray excuse my trespass upon your time and business.

Yours truly.

Woodhill, December, 1857. ADAM FERGUSSON.

The New York State Agricultural College.—The trustees of the N. Y. Agricultural College met on the 11th of November last and awarded to S. E. Hewes, Architect, of Albany, the sum of $250 for the the plan and specifications submitted by him with other competitors for the College buildings. The executive committee have also been instructed to make contracts for the lumber and materials for the buildings. The president of the College also made a report on the farm, and its management the past season was very satisfactory to the trustees.

DR. VOELCKER ON FARM-YARD MANURE.

"When doctors differ, who shall agree?" is a well-known adage bearing upon the various contradictions that arise among leading men when engaged in scientific subjects, and more especially upon all those in which chemistry is concerned. Take, for example, the investigations of Davy, Liebig, Way, Voelcker, and Lawes, and we find that they in their opinions as widely differ as do those great agricultural improvers, Smith, Huxtable, Kennedy, Caird, and Mechi. Take their present opinions, and compare them with those past, or with those of each other, and we shall find such discrepancies as to lead us but to echo the adage we have quoted.

If we view the soil only as a huge laboratory, in which the various ingredients that exist need only to be brought into action through the various combinations they may be made to produce, we shall only be pursuing the same course as the chemists before mentioned have done. If we view the land as it presents itself to our notice in its natural character as the means whereby plants derive their support, when also assisted by tillage, and a rotation best qualified to effect the object, we shall so come at a means conducive more than all others to a favourable result. For it is such a principle, combined with the application of the means at hand, such as marl, chalk, lime, and the ordinary manure produced upon the farm, that our best practical farmers have invariably pursued, adopting, as they have termed it, the best *shift* of husbandry suitable to each of their respective localities. Further, if we look carefully to results, we shall probably find that they have turned out to have been the most profitable. Indeed, it is notorious that those who have acquired the largest fortunes by farming are men who have pursued their object upon the principles long established and practised in the districts in which they have operated, rather than those who have reduced new theories to practice, which in many cases have led to their own injury or ruin.

Were we disposed to enumerate instances within our knowledge, in which experimentalists have failed in their attempts, we might have abundant opportunity of doing so. But it is not our intention inviduously to select any individual as having been especially unsuccessful, feeling that every one who strikes out a new path has much to overcome. And if he had even succeeded to show us a nearer and a better way, he would have still to encounter all the prejudices of those that have long followed the old one, and who might from habit have preferred their old rough path to the new and improved paved one.

We are induced to offer these remarks as bearing upon the subject of treating ordinary farm-yard manure, so far as the opinions of Professor Voelcker go, as set forth in the last number of the "Journal of the Royal Agricultural Society," and as at variance with the processes carried out by our best practical men, and upon which subject the Central London Farmers' Club lately had a most able discussion.

It has long been the practice of the farmers in the southern and eastern portions of the kingdom to carry out their manure, in the winter and spring, to the spot where it would be shortly afterwards required. To fully ensure its decomposition, the heaps, in most instances, were turned over to induce fermentation, as it has invariably been found necessary, to ensure neat cultivation, so to reduce the hard and woody portions of the manure to such a pulpy and soft state that plants might be enabled to readily appropriate them in their early stages of growth. After many years' successful experience in this way by farmers, they were at length told that by so doing the better portions of the manure would pass off during the time of the fermentation process, and that it would be better to convey the manure at once direct from the farm-yard to the field in its new and undecomposed state, but that in either case it was absolutely necessary to have it incorporated with the soil immediately upon its application, to prevent any loss of its ammonia, or other constituent manuring properties, by exposure to the atmosphere. It has, therefore, been the practice of our best farmers to cover it with the furrow as soon as possible after having been carted into the field, not only as the best mode of application, but as the best means of securing the utmost amount of benefit.

Such management, according to Professor Voelcker, is quite useless. He states that in dung-heaps under a state of fermentation, however excessive, that free ammonia is not generated except in the centre of the heap, where the heat is greatest, and where it has risen from 120 to 150 degrees Fahr.; and that it even then rarely escapes, except in very small quantity, as the external layers of the dung-heap, where but little heat is generated, arrest and fix it in its course and endeavour to escape; that the strong smell emanating from dung-heaps in a state of fermentation does not arise from the ammonia escaping, but it is rather to be attributed to peculiar volatile organic combinations—to some sulphurretted and phosphorretted

hydrogen, and a variety of other gaseous matters, amongst which ammonia as a gas is only found in very minute quantities.

Upon the other hand, the learned professor attributes the greatest injury sustained by farm-yard manure to arise from its being exposed to the action of rain-water, especially in open yards or after its removal to the field in heaps; and to obviate this, he recommends that the manure be carted immediately to the field, and incorporated with the soil—at all times a difficult task, and at the same time, frequently a slovenly mode of application.

The point thus maintained by the learned professor's investigations, that manure does not become materially depreciated by fermentation if at the same time kept free from the action of rain-water, being the one, which especially refers to the practice of most farmers, is after all, found to be good practice chemically. So, after fifty years controversy, it now again becomes established that the practice of our farmers has been the right one, so far as the circumstances combine to produce a generally beneficial result. We therefore conclude that such practices as have been long pursued in a district are most likely to be the best, inasmuch as they have been proved through successive generations, and adopted as those that have been found to be the most successful and profitable.—*Mark Lane Express.*

BUILDING HOUSES AND STABLES.

Probably as little attention is given by farmers to the fitness of their buildings for the purpose designed, as to any one subject connected with their profession.. In building houses for their own use, they seem to pay but little attention to ventilation. Their rooms are generally too low, and too small, especially sleeping rooms, which, in fact, ought to be large and as high as any room in the house, the kitchen perhaps excepted. The windows are generally too few, and too small, and open altogether at the bottom, when they ought to be open at the top also. If we ever require fresh air, it is when we are asleep. But, we should always have it. We should not, however, have a current of cold air, rushing directly in upon us when we sleep. Small, close, sleeping rooms are injurious to health. The walls of a sleeping room should not be less than ten feet high. To prove that ventilation is absolutely necessary for the proper enjoyment of your house, just make a room perfectly tight, then, (if in winter) build a roaring fire in the morning, and see how much water will drip from the windows upon your carpet. The air in the room beoomes hot, and, coming in contact with cold glass, is condensed, and ice is the result. Permit the hot air to ecsape, and let in the fresh air, and you have no ice on the window inside, no wet carpet or floor; and you will have good health for yourselves and children. Therefore, we say, *firstly, secondly' thirdly,* and *every time,* that fresh air is the most useful article in a farmer's house. Now for stables. The same principle holds good in this case. A stable should be warm, but dry and well ventilated. By all means build your stable above ground! An underground stable is the worst place that a horse was ever put into. It is better for him to stand behind a haystack, if well blanketed, as there he can have plenty of fresh air, and is not exposed to the diseases engendered by a close, damp, unhealthy stable. But neither extreme is necessary, under ordinary circumstances. The great fault with an under-ground stable, lies in the fact, that you cannot ventilate it freely and thoroughly. The current of fresh air always passes *over* it, instead of *through* it. Experience teaches you that there is too much steam in such a stable generally, which renders the air stagnant and unhealthy for man or beast. Besides, there is too much moisture arising from the bottom, which does not pass freely off. Therefore, we say, build your stables *above* ground. Wood is the best material for that purpose, although not the most durable. If you build of brick or stone, be careful to give your stable a thorough ventilation. Let every horse have plenty of air. Give up that old idea, that you have done your duty to your horse when you have given him a close stable. and a full crib.

CURE FOR CHAPPED HANDS.—Most of our juveniles during the winter season. are troubled with chapped hands; for the benefit of mothers, who are obliged to listen to their endless complaints, we publish the following recipe for chapped hanps :—"Take 3 drachms of camphor gum, 3 do, white beeswax, 3 do. spermaciti, 2 ounces olive oil—put them together in a cup on the stove where they will melt slowly and form a white ointment in a few minutes. If the hands be affected, anoint them on going to bed, and put on a pair of gloves. A day or two will suffice to heal them.

THE WHEAT MIDGE.

The ravages of this mysterious and destructive insect are still continued in New York and probably other parts. So destructive has it become in Western New York that the farmers generally have suspended in a great degree the culture of this important crop.

While making a recent tour through this State among the farmers, we took pains to examine with some care the wheat growing in some fields, in order to know more of this insect. We have known it for upwards of twenty-five years, and during this period its progress has been gradually westward, though its depredation seems hardly as universal and as extensive as it has proved in New York. The egg is deposited in the embryo grain, and while in the milky state the grain is devoured by them. In some grains from one to ten or fifteen are found, and in some fields hardly one head in a hundred will escape. To an unpractised eye, nothing peculiar in the appearance of the growing grain will be observed, but to one acquainted with it, it is readily perceptible by the heads standing more erect in consequence of the loss of grain. In appearance the insect resembles a minute maggot of an orange color, and when full grown is hardly the twelfth of an inch long, and quite slim, and when in the perfect or winged state it is apparently still more frail. Should circumstances favor its growth and development as it advances into the wheat growing sections of the West, its appearance may be regarded with no small degree of alarm. Whether like some other destructive insects it will finally pass away for a time, or whether its work of destruction is to be continued forever where it once finds its way time only can determine.

In New York, when it cannot find wheat in which to deposite its eggs it will attack rye and oats, but with less disastrous results, as wheat appears to be its favorite food.—*Valley Farmer.*

A FEW WORDS ON BEGINNING TO KEEP FOWLS.

To follow the spirit of the practical Mrs. Glass, when she says "first catch your hare," we must first consider procuring the fowls. Beyond every other error, avoid the common practice of getting a great lot of fowls cheap, and purchase rather a very small number of first rate birds. Let them come of a good stock, but do not depend *too much* on the strain they have sprung from; let the fowls themselves be very good. From such fowls every egg may be turned to account, and the majority of the chickens will be good. If these parent birds are from eighteen months to two years old, it will be a good thing; not that the chickens will be the better, but they will be easier to rear. The sooner the fowls are bought now the better, that they may get familiar to their home and with each other before the spring. Next year the stock may be crossed with advantage by the purchase of a sitting or two of eggs which can be depended on. They must have a good weather tight, but well ventilated, house, and the more liberty they have in their run the better. Besides the house, they should have a shed under which they may take shelter, and where they may have a pile of dust for cleaning their feathers. If such a shed has to be built for them, a frame-work of rough wood, with a good pitch to the top, covered with patent asphalted felt, will answer the purpose.

It may measure four or five feet from back to front, and be made as long as convenient, and underneath plenty of dry dust should be thrown. Besides shelter and dust, fowls must have access to gravel and lime. In the localities which are best for poultry rearing, they can find these things for themselves, while in less congenial spots almost everything of the kind, has to be brought. Gravel, with plenty of small stones, must be brought to the fowls, unless they can go out and find it for themselves. It is a good plan to have the runs well gravelled, especially if the birds can run out upon grass land. For lime, a few barrows full of old mortar—bricklayer's rubbish—may be thrown under the shed. Green food is another requisite of poultry. A good grass run is the best thing—liberty to go out into a field or orchard for a few hours each day. Lacking that, a little green food should be thrown to them every day—cut grass, cabbage, lettuce, &c.

Cleanliness is all important: daily cleansing of the henhouse and frequent sweeping of the runs, especially if they are limited in extent, will greatly conduce to the health of the inhabitants.

The important question of feeding, on which there are so many and such various opinions, comes next. Some judges recommenned the entire use of soft food—*i. e.*, food made of meal

of different kinds ; but we consider that a fowl's gizzard requires that corn should form a portion of its food, and consequently give one meal a day of corn to two of meal, sometimes varied by one meal of meal to two of corn.

When the important chicken season approaches, every egg should be saved, brought in when laid, marked with the date and the hen that laid it, and put by with care. If eggs are laid and saved very early, especial care must be taken that frost does not get at them. If they can be set before they are a week old, so much the better ; do not, at any rate, keep them more than a fortnight. There is sometimes a vexatious difficulty in getting a broody hen, just when a valued batch of eggs is ready ; for this a few Cochin hens are of great value, as, from laying in the winter, they often get broody at a time when their services in rearing chickens are most valuable. Their habit of turning off their chickens while still very young is objectionable ; but early in the season we cannot be choosers, and are therefore very glad to accept the services of Cochin mothers. Early in the season hens must be set in a warm place—*i. e.*, one safe from severe frost ; rather later they often do best in a nest of their own choosing out of doors. Seven or nine eggs are enough to give while the nights are very cold ; later the number may be increased to eleven, thirteen, or fifteen : we have generally found a better proportion of chickens in giving eleven than a larger number of eggs. Interfere as little as possible with the sitting hen ; only take care that she has food, water, and dust to roll in when she comes off, and that she gets back to her own nest. The hen in sitting close, does the best that can be done for the eggs, and help, even when necessary, seldom turns out well. We do not, at any rate, advise a beginner to meddle with the hen or her work.

When the chicks begin to pop out from under the mother, place before her a cup of large oatmeal, dry ; some barley meal, not too much moistened ; or barley crushed small. When the hatching is well over, remove the hen and her brood to a clean, warm nest, that the vermin likely to infest the one where she has set may not annoy the little chickens, for to them they would be quite dangerous. The next day the hen and her brood may be put down, either in a room, henhouse, or out of doors, according to the weather.

The best advice we can give about the chickens is : attend to them and feed them *very* often, beginning with chopped egg and breadcrumbs, crushed corn, oatmeal, &c., and give barley-meal instead of egg after the first week or two. Let them be kept safe from wet, damp, and cold easterly wind.—*Field.*

HOW TO MAKE HENS LAY IN WINTER.

Some writers on domestic poultry seem to think that there is no limit to fowls laying eggs, if they are managed and fed in a certain manner. This is fallacious, as a hen can be made to produce but about 100 to 150 eggs a year, if fed ever so well, and kept ever so warm in winter. Fowls are like the soil, they must have rest, and if we keep them laying all winter, they will be about barren in the spring, when it is the season for eggs, and when they are most used. It is a good plan to keep fowls warm in winter, and to feed them with fresh meat, when it can be done cheaply ; but it is not advisable to force them to lay too much.

We have been led to make these remarks, on seeing an extract from Bement's *Poulterer's Companion*, as annexed :—

TO HAVE EGGS IN WINTER.

The question is often asked, "Why cannot hens be made to lay as well in winter as in summer!" They can, to a certain extent ; but they require as a condition, that they be well provided with warm and comfortable lodging, clean apartments, plenty of food, pure water, gravel, lime, fine sand, and ashes to roll and bathe in.

There seem naturally to be two seasons of the year when hens lay ; early in the spring, and afterwards in the summer ; indicating that if fowls were left to themselves, they would, like wild birds, produce two broods a year.

Early spring-hatched birds, if kept in a warm place and fed plentifully and attended to, will generally commence laying about Christmas, or even somewhat earlier. In cold and damp this is not to be expected, and much may, in different seasons, depend on the state of the weather and the condition of the bird.

It is a well known fact, that from November to February (the very time when we want eggs the most) they are to many a bill of expense, without any profit. To promote fecundity and great laying in the hen, it is necessary that they be well fed on grain, boiled potatoes given to them warm, and occasionally animal food. In the summer they get their supply of

animal food in the form of worms and insects when suffered to run at large, unless their number is so great as to consume beyond the supply in their roving distance. I found it advantageous, in the summer, to open the gates occasionally, and give the fowls a run in the garden and in the field adjoining their yard, for a few hours in the day, when grasshoppers and other insects are plenty. I had two objects in view; one to benefit the fowls, and the other to destroy the insects. It will be found that the fecundity of hens will be increased or diminished, according to the supply of animal food furnished.

Hens moult and cast their feathers once every year, generally commencing in August and continuing till late in November. It is the approach, the duration and the consequences of this period, which put a stop to their laying. It is a critical time for all birds. All the time that it lasts, even to the time that the last feathers are replaced by new ones, till these are full grown, the wasting of nutritive juices, prepared from the food for the very purpose of promoting this growth, is considerable; and hence it is no wonder there should not remain enough in the body of the hen to cause the egg to grow.

Old hens cannot always be depended on for eggs in winter, they scarcely being in full feather before the last of December; and then, probably may not begin to lay till March or April, producing not more than twenty or thirty eggs; and this is probably the cause of the disappointment of those who have supplied themselves at the market with a stock to commence with, and get few or no eggs. As pullets do not moult the first year, they commence laying before the older hens, and by attending to the period of hatching, eggs may be produced during the year. An early brood of chickens, therefore, by being carefully sheltered from the cold and wet, and fed once a day on boiled potatoes, warm, with plenty of grain, and occasionally a little animal food, will begin to lay in the fall, or early in the winter.

Treatment of Hens.—Here is a timely item, containing a valuable hint to poultry keepers. An uncredited paragraph in an exchange says:—"Two flocks of hens were compared. One laid eggs almost all the time. The other laid scarcely any. On examining their treatment the following differences were found to exist; the former had a warm cellar to roost in during the winter; the latter roosted in a stable where the wind blew in. The former had a fine place in an open cellar for scratching among ashes, lime, and earth; the latter scratched in the manure heap, or in the stable when the cows were put out. The former had plenty of good water, with milk, etc.: the others had no drink except what they could find. It can be seen, we think, why one flock laid eggs generously, and the other did not."

ENGLISH PLOWING.

The Editor of the *Maine Farmer* informs us that:—

H. F. French in one of his letters in the *New England Farmer*, speaking of plowing in England, says, their work is done far better than ours, and it is either because they have better plows, or hold them better, and our farmers and plow makers may settle that question as they can.

I have seen a man in England, with a yoke of oxen harnessed in collars, like horses, with blinders on, and bits in their mouths, guiding them with reins, and holding the plow himself, striking out lands eighty rods long, with no stakes except at the ends absolutely straight, so that I could not see an inch variation in the distance.

It is a common operation here to plow land into ridges for mangold wurzels, drill four rows at a time with a horse drill, and when the crop is up, to horse hoe four rows at a time. Any person who will consider this statement, will perceive that all the operations must be accurate to admit of this treatment.

Height of Colts.—A very reliable rule to judge the height a colt will attain to when full grown, is the following:—When the colt gets to be three weeks old, or as soon as it is perfectly straightened in its limbs, measure from the edge of the hair on the hoofs to the middle of the first joint; and for every inch, it will grow to the height of a hand of four inches when its growth is matured. Thus, if this distance be found 16 inches, it will make a horse 16 hands high. By this means a man may know something of what sort of a horse with proper care, he is to expect from his colt.

THE GRASSES OF GREAT BRITAIN.

Professor Charles Johnson, Botanical lecturer at Guy's Hospital, England, has recently published a work on the natural history and uses of the grasses of Great Britiain. The work is highly illustrated, and is being issued in parts. All lovers of that department of husbandry, which has direct reference to the production of fine stock, ought to be especially interested in the development of every fact pertaining to the grasses. We need much information on this important subject, and hope the useful labours of Professor Charles Johnson willbe duly appreciated. Treating of the Sweet-scented Meadow Grass (*Anthoxanthum adoratum*) he gives the following information :—

" Some of the earlier writers upon the relative qualities of British grasses as fodder, seem to regard that before us as a valuable and important one to the farmer. Stillingfleet observes that, 'Being found on such kinds of pastures as sheep are fond of, and from whence excellent mutton comes, it is most likely to be a good grass for sheep pastures;' and recommends the collection of its seeds, which he assures us, from his own experience, are ' very easy to gather.' And I have somewhere else met with a proposition for sowing it on those sheep-downs where it does not exist, in order to improve the flavour of the mutton. In opposition to such practice, I have myself observed that, on some of those of Kent and Sussex, its leaves are almost continually left untouched by the sheep, or only cropped when, in dry seasons, food becomes scarce. In the experiments made by Linnæus and his colleagues, it appears that cows, horses, goats, and sheep, ate it when offered to them apart, ; but these experiments were too limited and too carelessly conducted to warrant the importance attached to them at the time ; and as far as the last mentioned animals are concerned, Stillingfleet's mutton must have owed its ' excellence' to other sources. They seem, however, to have had considerable influence on the opinions of the earlier agricultural systematizers of this country ; and the sweet-scented vernal grass always holds a place among the species recommended by them for the production of improved meadow-land. The scantiness of the foliage is very much against its value as an economical grass ; it yields little to the scythe, while in permanent pastures it occupies the place of others mor nutritive and better liked by cattle generally. Whether its wide distribution among the latter, in almost all soils and situations, may not be productive of some wholesome medicinal effect on the more promiscously feeding grazing animals, is a question perhaps deserving consideration ; the more so, that certain tropical grasses, celebrated on account of their fragrance, have long been employed in their respective countries, with a view to the benefit derived from their tonic, stomachic, and other qualities."

SALT FOR PLUM TREES.

It is now almost impossible to cultivate any kind of plums in this climate, unless salt enters liberally as an ingredient into the compost applied to them. When this article is used in conjunction with house ashes, there appears rarely to be much difficulty in producing good and healthy trees, which ultimately prove highly productive of fair and well developed fruit. When trees are set in situations in which application of compost is not feasible or where it would subject the operator to considerable fatigue or expense, salt, in its crude state, may be applied ; or it may be dissolved and poured around the roots.

If plum trees were carefully washed down once or twice a year in a whiskey lye, and supplied with two or three quarts each of salt—care being taken to retain the soil around their roots light and free from weeds, we should hear far fewer complaints of want of success in this department of pomological enterprise. No fruit commands a more ready sale or higher price in the market. Good plums are at present so scarce as to render them a luxury, and those who have valuable trees in good bearing, are realizing a heavy profit from them. Let those who have trees profit by the above suggestion ; they indicate the only legitimate course to be pursued.—*New England Farmer.*

The Delaware Grape was amongst the varieties shown at the meeting of the committee of the State Pomological Society of Ohio. This variety ripens from two to three weeks earlier than the Isabella, and is very hardy. The fruit also seems to withstand a moderate freeze.

HOP GROWING IN NEW YORK STATE.

The Editor of the *Homestead*, in a letter from Richmond Springs, N. Y., for his own journal, furnishes the following information on the subject of Hops:—

Hops are the universal crop in this region, there being a few farmers who have not a yard, and some of them cultivating a dozen or more acres. It is the main crop relied on for ready money, and is cultivated by most farmers to the neglect of everything else. Probably more hops are grown in the two counties of Otsego and Madison, than in all the rest of the State, and probably one-third of all the hops grown in the country are raised in this vicinity. It is estimated that there are 2500 acres devoted to this crop, and the yield is from 500 to 2000 pounds to the acre. The whole crop cannot be less than a million of pounds, and some put it a third higher. The soil is well adapted to this crop, and farmers who understand the management, curing and sale of hops, make it profitable. It requires a considerable capital to carry it on, a good deal of skill in curing, and the market price depending upon the European crops fluctuates a good deal. It is an article in which speculators deal largely, and fortunes are made and lost very suddenly.

The poles used by the best growers come from Canada, and are mainly spruce and cedar. They cost about fourteen dollars a hundred, and it takes two hundred dollars to furnish an acre with poles; then every farmer has to build a kiln for the drying of hops, and a room for storing them, and a press for packing them in bales before they can be sent to market. They require manure, and the general objection urged against their cultivation is, that they take all the manure of the farm.

The best land is selected for the hop yard, and it is made the pet of the cultivator. Everything else must be neglected for this. The hops are set out in hills about seven feet apart, and it takes about five bushels of roots to supply an acre. These roots cost 75 cents to $3 per bushel, according to the price of hops. They are cheap now, as some are disgusted with the fluctuations of the market, and are plowing up their yards.

The rule is to set two poles to each hill, inclining from each other, and to allow two vines to each pole. The whole strength of the root is thrown into these four runners, and all the side shoots on the first half of the pole are plucked off early in the season. The crop is plowed and cultivated between the rows like corn. The plow runs pretty deep in the middle of the seven feet space, and very shallow near the hills. The crop is very light with young vines. A plantation lasts six or eight years.

The picking of hops is mainly done by girls brought from the neighboring village for the purpose. The season only lasts about three weeks, and the wages are about $2,50 a week. This need of extra help in harvest time is one of the objections to this crop.

The hops are carried in sacks from picking boxes in the field to the kiln, where they are dried by artificial heat. Some of the kilns will dry a thousand pounds at one heat, and it takes about twenty-four hours to dry them. It is the practice to dry at night all that are picked during the day. After drying they are removed to the store room to air, where they remain two or three weeks, and are then packed in bales with the press.

The profits of hop growing were large, when the market price was forty cents a pound, and many went into the business. Two thousand pounds to the acre is not an uncommon crop, and eight hundred dollars from a single acre is not easily made by any other crop. But there are a few farmers who eschew hops on moral grounds, and there are others who doubt their economy in the long run. The temperance men say the crop goes mainly to the brewers, and tends directly to the increase of alcoholic drinks and so to intemperance.

Birds' Nests for Dinner.—The bird that supplies this whimsical luxury for the Chinese table is a small swallow the *hirundo esculenta*, which builds its nest on the steep precipices and rocks that overhang the sea. It is found almost only in the Islands of Malaysia. But the price paid to gratify this curious Chinese taste is very high. To procure the delicacy, the risk to life alone is tremendous—from the lofty, deep and dangerous caverns frequented by the swallows—and when brought to the Chinese market, the value is enormous—the finest kind often being sold at £800 for only a hundred weight, or about twice the weight in silver! For this reason it can appear only on the tables of the wealthy, and is not a common dish with other classes.—*Life in China.*

A pomegranate has ripened in the open air in England, ou the south side of a wall in a garden in Essex.

GRAPE CULTIVATION IN BAYFIELD.

BY A. B. BROWNSON.

When I arrived here about ten years past, I had two grape vines given to me, one was the Black Hamburg, the other White Sweet Water. I waited until the season for transplanting, then went in a hurry for them, dug, returned, planted, all in a hurry, but the little rogues did not pattern after my taste, for they were in no hurry to grow nor yet to bear. They took their own time to grow a produce; yet after two or three years they produced a few bunches of half-sized, half-starved and half-ripe fruit, and so went on for two or three years and then mildewed.—I am convinced that all attempts to grow tho Foreign Grape in the open air will prove a failure.

I was not discouraged from my sundry disappointments. I had seen the native grape flourish in the States, it is true, where the climate is more genial, and I bought three young plants, viz: the Catawaba, Isabella and Clinton. I had them taken up by experienced men, packed with care and brought them home—buried them for a day or two until I could get time to put them out as they ought to be; so I begun by digging a hole four feet square, three feet deep, then filled the bottom with stones, bricks and old pieces of dried mortar, broken bottles and a quantity of broken bones and then filled up with a good compost of rotten barn-yard manure, sand and clay. I spent about three hours to each vine, my Catawba never grew, but the Isabella and the Clinton grew rapidly, particularly the Clinton, and we had a few bunches of them last year as late as the middle of January, as fresh and as perfect as if just then taken off the vine. Its long keeping qualities, its hardiness and productiveness is a proof to me that it alone is our grape for this northern latitude.—Even in the States in backward seasons, it is the only variety which ripens to perfection. It has proved to be the best wine-making grape. It succeeds well in all dry situations, and is never troubled with mildew or rot. It would pay well to have a plantation of this variety for wine-making purposes, as the wine brings from two to three dollars per gallon for Sacramental purposes. The vine grows rapidly and is easily propagated—striking readily from cuttings,—the shoots slender and wiry, ripening so as to be firm, hence its hardness. It will stand the coldest winter without any protection. The wood is grayish brown, shot jointed leaves, thin and sharply serrated, resembling our wild fox grape; the bunches are small and compact in clusters; the berries small to medium, color black, juicy, with much pulp, rather acid when first gathered, they improve by keeping the same as winter pears will do by house-ripening. It is a prodigious bearer and ripens in any locality three weeks earlier than the Isabella, and a month before the Catawba. I have several other novelties, but have not fruited them yet, so I cannot say what they may turn out to be, but should they prove superior, I will give you a description of them.

THE DIOSCOREA.

Hovey's Magazine says:—"Another year's experience in the culture of the Dioscorea has given us a higher estimate of its value, and it is probable, as we learn how to produce it in greater perfection, it will continue to improve in the estimation of all who undertake to raise it. There appears to be little or no doubt of the superior excellence of the yam, among all who have had a good opportunity to test it; the only doubt seems to be in regard to its profitable culture—whether it can be raised with anything like the ease and certainty of the potato, and yield as average a crop as that vegetable. In this respect more experiments are wanting to arrive at a satisfactory result, and for the preasent this must remain an open question. If its excellence as a nutritous esculent is fully established, time will settle the question of its profitable culture upon an extensive scale.

"The present year several large and very fine specimens have been produced, weighing from one to two and a half pounds each, a more gratifying result than many doubting persons anticipated. At the United States Agricultural Show at Philadelphia, last year, some very fine specimens were contributed by Messrs. Prince; and this year, at the Fair of the American Institute, N. Y., just closed, the same persons presented tubers of similar quality. At the former show the yams underwent the trial of a committee of gentlemen in regard to their excellence for the table, and the report of that committee was unanimously, we believe, in favour of the dioscorea, as a most delicious and nutritious vegetable, every way worthy

the attention it had received from the distinguished professors and agriculturists who took so deep an interest in its introduction to France.

"Our own specimens this year have been very much superior to those of previous years, though without any very particular cultivation. The tubers were planted in the open ground as soon as the weather would allow, and without any preparation of the soil, in a level bed. The earth was not ridged up as we think it should be. They grew, however, rapidly, the vines covering the ground, and the tubers upon digging weighed from *one to two pounds* each; they were about fifteen inches long, and quite as large for two thirds their length towards the bottom as the sweet potatoes usually sold in our markets. Altogether the experience of the present year has been highly satisfactory, and we anticipate a far greater result from the introduction of this root than has heretofore been expected.

"We have no knowledge of the progress made in its cultivation in France the present year; it is rather too early to hear of the results of their experiments. Undoubtedly its culture has been made a special object in some of the government institutions, and the public will be apprized of their importance. We shall look forward to some account of them in the horticultural journals of the day, and give the results in our pages."

ADULTERATION OF BREAD.

In a review of a work of rather an alarming title, namely, "Is Killing Murder," published in the London *Farmer's Magazine*, we obtain the following information on the subject of adulterating bread in England:—

"Dr. Hassall and Dr. Normandy, (the latter a Prosessor of Analytical Chemistry,) have gone to work in the most wholesale manner, making a complete sweepstake of the tradesmen in a neighbourhood—obtaining samples from each, of various articles, and finding them, by testing, all adulterated. Thus, of two lots of samples of bread of twenty-five each, every sample contained alum. Chalk, clay, potato starch, &c., are used by some of the bakers in the low neighbourhoods; and whitening has been known to be used in large quantities in bread. The less pernicious, but still fraudulent, practice of mixing barley, beans, peas, and potato farino with wheaten flour, is also practiced by the millers, to an enormous extent. The testimony of the two gentlemen we have named, is corroborated by F. C. Calvert, Esq., Professor of Chemistry at the Royal Institution, Manchester; Dr. N. Carpenter, Examiner in Physiology in the University of London; Mr. Julian Rogers, Anayltical Chemist; and last, not least, Dr. Letheby, Analyst and Medical Officer for the city of London; who all speak both to the facts and to the deleterious character of the various ingredients put into bread."

LARD AND RESIN FOR TOOLS.

Look at the plows, harrows, cultivators, hoes, shovels, forks, chains, axes, saws, not to enumerate wagon irons, and a multitude of little tools that ought to be provided on or about any farm, and then reckon up how many of them will be lost where the combined effect of air and moisture will attack their surfaces and eat away, enough to render them rough at least, if not to materially depreciate their value. Many instruments are destroyed faster by lying idle than they could be by constant wear. We will not now write a homily upon the value and importance of a *tool-house*, and of having every implement stored in it, but give a recipe for an exceedingly simple, cheap and effective preparation, one available to all, which will at least save all metals from loss by rust.

Take about three pounds of lard and one pound of resin. Melt them together in a basin or kettle and rub over all iron and steel surfaces in danger of being rusted. It can be put on with a brush or piece of cloth, and wherever it is applied it most effectually keeps air and moisture away, and of course prevents rust. When knives and forks, or other household articles, liable to become rusted and spotted, are to be laid away, rub them over with this mixture, and they will come out bright and clean even years afterwards. The coating may be so thin as not to be perceived, and it will still be effectual. Let every one keep a dish of this preparation on hand. As it does not spoil of itself; it may be kept ready mixed for months or years. *Mem.* Fresh lard, containing no salt, should be used. Resin is a cheap article, and may be obtained almost anywhere for four to six cents per pound.—*Mich. Argus.*

Profits of Grape Culture in France.—We learn from the *Moniteur Vincole*, the following suggestive hints relatiye to the wine revenue of France :—" France contains about 5,000,000 acres of vineyards, which are estimated to yield about 80,000,000 barrels of Wine annually, or about two barrels for each inhabitant, the aggregate worth of this vintage is $600,000,000."

Weather Sign.—In a cloudy morning it is a matter of importance to the farmer, to know whether it will be sunshiny or showery in the afternoon. If the ants have cleaned their holes nicely, and piled the dirt up high, it seldom fails to bring a clear day. Spider-webs will be very numerous about the tops of the grass and grain, some cloudy mornings ; and 50 years observation has shown the writer of this, that those little guessers seldom fail—*Ex.*

Infinite toil would not enable you to sweep away a mist—but by ascending a little you may often look over it altogether. So it is with our moral improvement ; we wrestle fiercely with a vicious habit, which would have no hold upon us if we ascended into a higher moral atmosphere.

Give the Plow and the Hoe no Rest.—1. In order to prevent the growth of weeds. 2 To ensure needed moisture through the deposition of a greater amount of *dew*, upon which plants so largely depend—softening the earth, so that the moisture that condenses upon the surface may penetrate more deeply, and rendering it more porous for the easier passage of the atmosphere, for condensation in the cooler soil below. 3. To secure a greater absorption of ammonia. 4. To aid in the decomposition of minerals whose elements are the food of plants.

EDITORIAL NOTICES.

Advertisments.—As stated in another place, we have omitted the advertising pages this year. The expense was greater than the profit. Those who may wish to apprise our readers of a forthcoming sale of stock, or some other fact of interest to the farming community, can do so through an editorial notice. In many cases this will answer quite as well as a long advertisement.

Wheat Insects—Prize Essay.—We are happy to announce that through the aid of the Bureau and Board of Agriculture, we are able to supply to our subscribers this year, with a copy of Mr. Hind's Prize Essay on " The Insects and Diseases injurious to Wheat Crops." This is a most valuable work, which should be preserved and *studied* by every farmer into whose hands it may come. This " Essay " is worth far more than the subscription price of the *Agriculturist*, and we hope it may be the means of extending its circulation.

Durham Stock.—Mr. John Walton, of Peterboro, offers for sale young bulls and heifers, of thorough-bred stock. Mr. Walton's herd is of first-rate quality. He is one of the most skillful breeders in the country, and in his dealings an honourable man.

Bone Manure.—Mr. Peter R. Lamb, of this city, has got his bone mill in operation. We have before us specimens of his fine ground at 60 cents per bushel ; ½ inch at 50 cents, and ¾ inch at 45 cents. It is unnecessary to commend this as manure. Every person who wants to get a *strong* fertilizer, and one about which there can be no humbug, should apply to Mr. Lamb.

TERMS OF AGRICULTURIST FOR 1858.

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☞ A bonus of *ten copies* allowed for every hundred ordered by any Society.

☞ Payment always *in advance*.

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MANURES.

INCRUSTATION OF SEEDS.

A new idea, or an old idea newly applied in regard to plant-food, or manure, is just now attracting attention in France and England. We have read the discussions and suggestions on the subject with much interest, and we believe the intelligent, enquiring readers of the *Agriculturist*, will agree with us, after perusing the following summary of the new plan and the reasonings in support of it, that it is a matter well worthy of consideration and experimental test by the practical as well as the scientific farmer. Concentrated manures are but little used in this country as yet, but every year they are becoming more important. Formerly, when science was still in its infancy, experience to a certain extent, but routine especially, were the only guides of agriculturists in their modes of preparing the ground for the reception of the seed. Farm-yard manures and bare fallows were the only means of restoring the spent energies of the soil ; and these were then, and are even now to a great extent, indiscriminately resorted to, without any regard to the chemical constitution of the soil, or the requirements of the plants that are to grow upon it. This remark applies to the best cultivated portions of Europe, as well as nearly the whole of America. Analytic science, and the wonderful discoveries of vegetable physiology, have of late years thrown a great deal of light upon the subject of manure, its mode of application to the soil,and its assimilation by the plants. And yet, practically, little progress has been made. We see a great many kinds of artificial manures daily advertised in the agricultural papers of Great Britain and the United States, but, after all, the progress accomplished is by no means adequate to the strides which science has made in the analytic knowledge of manures, in the exact appreciation of their fertilizing qualities and their action upon vegetation in various plants. We still cart away to our fields the same ponderous loads of farm-yard dung, a large per centage of which is of no earthly use, and can only be regarded

as the huge vehicle of a very minute proportion of ammonia and alkaline salts. Even guano and superphosphate of lime are encumbered with a large proportion of useless ingredients, all of which are costly to purchase and cumbersome, and therefore expensive to carry. Besides, what a large proportion of the manure which we lay over our fields is utterly lost to the crop we want to grow ! What a large per centage is eaten up by noxious weeds, or disseminated through a part of the soil untouched by the roots, and therefore immediately useless ! On the other hand, we know, from clear demonstration, what the substances are which each crop draws from the soil ; we know to a fraction the quantity of each of those substances respectively ; and when we come to compare their aggregate weight per acre, with the quantity of manure which we have laid over that extent of ground, we are astounded at the difference in bulk and weight. If a plant is dried and burnt, the little pinch of ashes that remains, after complete combustion, represents the amount of mineral substances which the plant has drawn from the soil. The rest, which has evaporated in the air by the process of combustion, represents those constituent parts which the plant has derived from the air. Chemistry tells us exactly what substances the ashes contain, and in what proportionate quantities. It is then obvious that either the soil or the manures put on it, or, as is most generally the case, both combined, have supplied those substances to the plant, without which it could not have arrived at maturity. But here we may well pause, and ask ourselves whether, in order to administer to the plant so small a quantity of food—another and a more simple mode cannot be found ; for that quantity, though it be multiplied by the number of plants in an acre of ground, still remains comparatively minute when we compare it with the bulk and weight of the 20 or 25 cubic yards of dung we have laid over it. Again, if we calculate the cost of that manure and the value of the labour which its use has necessitated, we find that the little heap of ashes which has been the result, has cost us an immense sum of money ; in fact, a much higher sum than the pure chemicals of which it consists, could be bought for in the trade.

These considerations have of late years induced both scientific men and practical agriculturalists to turn their attention to concentrated manures, that is, diminishing the bulk of useless substances, serving merely as vehicles to the really fertilizing element, in order to render them more portable, and more energetic, proportionately with their bulk. Abstractedly, this is evidently the goal of our progressive ideas in agriculture; that is, the simplification of all means, either in labour or manures—the one by concentration of fertilizing energies ; the other by means of ingenious machinery, and especially the use of steam power in field as well as barn operations. It is true to a certain extent that, apart from the primary purpose of restoring the exhausted fertility of the soil, stable and other bulky manures have other advantages, mechanical and thermal ; for instance, in dividing a stiff soil, and imparting to it a higher temperature by decomposition from fermentation. But, with thorough drainage, these advantages have become less important.

The bulk of cultivated lands of this country, and indeed of America generally, do not require this mechanical action of stable manure. The question then arises, How can we best turn these scientific discoveries to practical account? How can we concentrate manures, and having succeeded in this, how can we apply them? This brings us to the "new idea" we have referred to, and we shall allow one of the French writers on the subject to state the theory in his own words:—

"Boussingault, in his recent experiments in the production of what he calls a *limit* plant has proved that the seeds of many plants contain the necessary quantity of nitrogen, not only for the germination of the plant and the nutrition of the nascent stem and leaves before the radicles have been sufficiently developed to draw a supply from the soil, but also to the production of a perfectly organized plant, though exceedingly reduced in its dimensions. In fact, such a plant—after several months' existence in the open air, or even in a confined atmosphere—has been found to weigh but very little more than the seed from which it sprang. This clearly shows that the extent of the organism of that plant was limited by the quantity of the nitrogenous principles contained in the seed; but as soon as he applied to the soil (exclusively composed of calcined quartz sand, not containing a particle of decomposed matter or mineral manure) a small quantity of phosphate of lime, nitrate of potash, and vegetable ashes rich in silicate of potash, the plant immediately sprang up from its torpor and grew luxuriant and strong, bloomed and brought forth matured seed as well and as rapidly as another plant of the same kind had done upon a garden-strip richly manured.

"This experiment clearly shows that the soil upon which the plant grew exercised no immediate influence whatever upon the growth of the plant, so far as its nutrition went, but merely as a vehicle for heat and moisture, as well as the holder of the plant and of the pure mineral salts upon which it lived and developed itself. This naturally leads us to ask the question, whether, instead of incurring great expense and trouble in manuring the soil thoroughly with heaps of dung containing but a small percentage of fertilizing matter, which is still reduced and less available to the plant by being disseminated over a larger surface than the roots of the plant can possibly compass, it be not possible to manure the seed itself, that is, surround it by a crust formed of the very mineral substances which are necessary to its growth, in the same proportion as they are found to exist in the seed, and in a sufficient quantity to represent exactly the weight of the aggregate mineral substances which are abstracted from the soil by the well-matured normal plant? This crust could then be considered as the mere extension of the seed to a larger bulk; and as the seed contains what is necessary to feed germination, and even to form a complete plant, though limited in weight to the extent of food contained in the seed, so the seed being increased to any required number of times its size and weight by the agglomeration of substances, such as phosphates, nitrates, and silicates, would be enabled to supply to the growing plant the necessary elements of normal growth and perfect maturity.

"This is indeed no new theory, and many have been the attempts even in times of remote antiquity to realize it in a practical manner. Many are the inventors of wonderful liquids, in which the seeds were to be steeped, and thereby imbibe all the required elements of nutrition and fertility. All these have failed, not because the principle was not a sound one, but because it was not properly applied. For it is obvious that a liquid manure, however rich in fertilizing elements, could not fix these round the seed in a sufficient quantity so as to increase its store of nutritive matters—this can only be done in a solid form. Then, until very recently there was also the insuperable difficulty arising from ignorance, science not having yet shed the light of its discoveries on the mysteries of vegetation; and the wonderful action of phosphates, nitrates, and silicates upon vegetation, although practically known, had not been determined with sufficient minuteness and accuracy to lead to anything like an authentic formula of proportion and quantity. But failures, however complete they may be, in carrying out great ideas, are no argument against a renewal of efforts; and when those failures, as in the case of steam-engines, railways, reaping-machines, or the application of steam to the cultivation of the soil, are found to act rather as incentives to the ingenuity of men, instead of damping their energy and the buoyancy of their hopes, we know it from the experience of the last thirty years that it is a sure sign that the idea is good, and will be ultimately carried out.

"But there are objections to this system. What system is free from objections? Some say

that the mineral matter with which the seed is enveloped, on being disolved in the soil, will settle immediately around the neck of the roots, which will naturally dive away from it, and it will then become useless to the progress of the plant after it has attained a certain development. I believe that this objection is more specious than real; for every one must have observed that when a seed has fallen upon a manure heap, and there germinated to a plant, if that plant be pulled up, it is found that the roots are very short and shaggy, and do not seem to have penetrated beyond a very limited area, the number of rootlets making up for the deficiency of their length. This seems to me easily accounted for; because the roots, finding in their immediate vicinity a sufficient supply of nutritive elements, have no inducement to dive at any great length in search of them."

"However plausible this and other objections may be, the best test, after all, is the test of experience; and that system, which I have called, for want of a better word, the incrustation of seeds, must live or die by that great test. A French gentleman has recently come to this country, to submit his invention of a machine for preparing the seed, and the formulas regulating the nature, proportions, and quantities of the mineral substances to be used, to the verdict of English practical farmers; and I am in a position to state that his appeal has been favourably received, and experiments are being made in various parts of England with the view of testing the value of that gentleman's discoveries. Messrs. Burgess and Key have been entrusted with the construction of the simple machine for the encrustation of the seed. This machine consists in a hollow cylinder, suspended by two leather straps from a pully, to which a rotary motion of about forty revolutions in a minute is imparted, either from a steam-engine or any other motive power. In the cylinder the seed is introduced mixed with an agglutinous mixture, itself rich in nitrogen; and then the mineral substances, reduced to a fine powder are added, and from the rotary motion of the cylinder adhere to the seed in a regular coating; this is repeated until the entire quantity has been fixed. In order to prevent the humidity of the agglutinous mixture from acting upon the seed, and causing it to germinate before it is put into the soil, an hygrometric substance is mixed with the mineral powders, which abstracts all the excess of humidity from the glue, and besides dries up the crusted seeds almost immediately.

"Previous to his coming to this country, Mons. D'Illiers has satisfied himself by numerous experiments of the value of his discovery; and at the late sowing season, a large area has been sown with his prepared seed in various parts of France, so that at the time of next harvest I shall be enabled to give an authentic account of experiments tried both in France and in England, under every variety of local circumstances of soil, climate, and modes of husbandry."

Why should not experiments on subjects of this kind be undertaken in this country also? Could not the Board of Agriculture devote a portion of their time and funds, with great advantage to the farmers of Canada, to the testing of manures, and the best modes of applying them? The subject is one of immense importance, and *must* soon engage the attention of every man interested in maintaining the fertility of the soil.

EVILS OF OVER-FATTENING STOCK.

For many years grave objections have been repeatedly urged against the practice of the excessively artificial system of feeding cattle, sheep, and pigs, for the exhibition of fat stock, especially the Smithfield Christmas Show in London. An elaborate and scientific report on rigid examinations of certain animals which took premiums at the last Smithfield Exhibition, has just been published, and which cannot fail to awaken general attention to this subject. The report is the production of Mr Gant, assistant-surgeon to the Royal Free Hospital, whose knowledge of general and comparative anatomy, and well-known familiarity with the use of the microscope, entitle his state-

ments to respect. His microscopical observations are confirmed by the celebrated Professor Queckett, curator of the Royal College of Surgeons.

After describing the living appearance of certain prize animals at the Show, such as cattle, sheep, and pigs, some of them owned by the Prince Consort and the Duke of Richmond, all monstrously fat, and exhibiting great difficulty in breathing, Mr. Gant observes :—"Throughout the exhibition one circumstance particularly arrested my attention. It was the size of the animals compared with their respective ages. The bullocks averaged from two to three years ; the pigs and sheep were about one year old. When I contrasted the enormous bulk of each animal with the short period in which so much fat or flesh had been produced, I certainly indulged in a physiological reflection on the high pressure work against time which certain internal organs, as the stomach, liver, heart, and lungs must have undergone at such a very early age. I therefore resolved to follow up those animals to their several destinations, and to inspect their condition after death." Mr. Gant was admitted to the slaughter houses when the gold and silver prize bullocks, heifers, pigs and sheep, that remained in London, were killed, and after carefully removing the heart, lungs, liver, &c., he made dissections of these organs, and provided faithful drawings of both their visible and microscopical appearances. Our space will only admit of a slight reference to their symptoms.

In the sheep, the hearts of several specimens were found in an unnatural, that is, unsound condition ; the external surfaces very soft, greasy, and of a dirty brownish yellow colour, motted with yellow spots of fat imbedded in the substance of the heart. Under the microscope the process was readily detected of the muscles being changed into, or overlaid by fat. The lungs were flabby, with numerous tubercles, and their function, or power of action, greatly diminished. Similar observations apply to the pigs, whose circulating system suffered serious interruption, indicated by the dark, livid liver. In horned cattle, the left ventricle of the heart had, in the several instances examined, been more or less converted into fat, having a yellow, soft, and greasy appearance. The intestines also exhibited a fat, putty-like mass, from an inch to an inch and a-half thick, in various parts of their surfaces. The worst feature of high breeding, early maturity, and consequent aptitude to fatten, appears to be under our modern stimulating system to convert the most important organ of life and health into a mass of fat. The stomach may indeed prepare food for the production of blood, and the lungs and kidneys may purify it of excrementitious matter, but these departments of the blood-factory are only subsidiary to the heart,, whose special duty it is to propel the vital fluid to the most distant recesses of the body; that every part may be nourished and renovated. Yet I found the great central organ more than any other damaged. * * * This material (fat) may itself be regarded as the superfluous food with which the animal had been gorged. It was first deposited in all loose parts of the body, these being most adapted for its accumulation, beneath the skin, and around the kidneys, stomach, intestines and

heart. At length, in such localities, the fat invaded the muscles themselves, by passing in between the fibres. Thus is produced the streaked appearance of meat,—a condition which, within due limits, in no way interferes with the health of the animal, nor impairs the nutritive quality of its flesh for food. On the contrary, fat itself is a necessary constituent of the most nutritious food; and by no provision can a due proportion of this ingredient be secured so effectually as when it is thus intermixed with the substance of the muscles themselves. Thus each mouthful of meat contains a wholesome and agreeable proportion of fat; but beyond these limits an animal cannot be fattened without impairing its own health, and also its nutritive value as human food. Let an animal be fed beyond the limits compatible with health, and the superfluous fat is no longer confined to the interstices of muscular fibres, but actually invades, and eventually supersedes them."

It may be said that there is but little danger of over-fattening live stock in Canada, as our animals, generally, are not distinguished for too high breeding, nor are they crammed and pampered with oily and stimulating food. We have seen, however, particularly at our butchers' Christmas show of meat in Toronto, both cattle, sheep, and swine, fattened to a degree that can scarcely be considered compatible with the health of the animals, or the wholesomeness of their meat for human food. Both sheep and cattle, although in low condition in spring, will often upon our pastures in summer and autumn, lay on fat rapidly, sufficiently so for all useful and practical purposes, without recourse to artificial stimulants.

The Report thus concludes :—"Under the present system the public have no guarantee, and are not insured the best, if indeed the cheapest food. The bulky withers of a fat bullock are no criterion of health, for his flat, tubular back may conceal the revolting ravages of disease. All this alone can be discovered by an inspection of the animal's interior after death. The flesh of animals which has been produced by organs themselves diseased, is itself also necessarily deteriorated, and ought not to be regarded as prime samples of human food. These facts will be best understood by pathologists, but they also come home to the understanding, and certainly to the stomachs of the people."

A Miraculous Corn.—The Michigan "Farmer" says: There are new circulars being issued which proclaim the Wyandotte Prolific Corn, the wonder of the age, Its yield is terrific - 20 stalks from a single grain, and 128 bushels of shelled corn a common product. This is all certified to by respectable parties, and of course we have to believe it. It must be so, or it would not be put in print! especially by those who have the corn for sale at the rate of $4 00 enough to plant an acre. Wyandotte corn is a new variety of white corn, said to have come originally from California, where it was cultivated by a tribe of Indians of that name. It stools out more than any other variety, and if the accounts are correct, it yields remarkably. Mr. Wm. Cochrane of Corunna, Shiawaesse county, the agent of Messrs. Penfield, Burrall & Co,, nurserymen, Lockport, N. Y., called upon us on the 25th. and showed us an ear of this corn, which he had bought at Evansville, Indiana. It was one of fourteen which had grown from a single grain. The ear was handsome in shape, about 11 inches long, and the grains of corn were large, white, flat, compact and regular. The question is, will this corn ripen as far North as this. It did not ripen in New York this past season, but it was an unusually wet, cold fall, and spring. The Wyandotte corn certainly is worth trying, but don't depend upon it for a crop.

DR. VOELCKER ON THE COMPARATIVE VALUE OF ARTIFICIAL AND FARM-YARD MANURES.

Professor Voelcker recently delivered a lecture on the above subject, in the Lion Rooms, Shrewsbury.

The CHAIRMAN said the subject upon which they were about to hear a very interesting lecture was a very important one to the farmer.

Dr. VOELCKER said there had been a good deal of talk about the relative merits of farm yard manure and artificials. Some would have nothing but the former, while others evidently thought the perfection of good farming was to use an unlimited quantity of artificial manure. Many of the latter gentlemen troubled themselves very little about what they really bought; it sufficed for them to expend a certain amount of money on some description of artificial manure, which might be entirely valueless for their particular purpose. Such, for instance, as the London Economic, the essence of Guano, and others. Now, farm-yard manure was an excellent thing in its proper place, and so was any other description of manure. Some artificial manures, which were exceedingly valuable, lost their efficacy from being improperly applied, and a great quantity of valuable manure at the present day was wasted on farms for the want of knowledge necessary for its application. Those who had not sufficient intelligence or general knowledge on the subject of plants would be less likely to go wrong if they followed the old-fashioned routine and used farm-yard manure, than by using artificial manure, which at least would be of no use to them. Some knowledge ought to be had of the wants of the different crops that grow in rotation. Those wants could not well be laid before his hearers without a reference to the character or properties of the soil to which they were applied. On the whole, the proper system of manuring required a great deal of rudimentary knowledge, which could not be treated of in a single lecture. He would, therefore, rather offer a few remarks on the comparative advantages of natural and artificial manure; and each of these possessed peculiarities of their own, which rendered them perfectly well adapted to special purposes. As would be seen on reference to the diagrams, one peculiarity of farm-yard manure was its extreme complexity of character. [The diagram referred to, contained the analysis of the component parts of fresh and rotten manure.] It contained both organic and inorganic food, and was applicable to a variety of crops, such as corn, root crops, and grass land; and this, no doubt, was the reason why farm-yard manure was entitled to the name of universal manure. It contained everything required by our cultivated crops. But he did not say that it should always be used indiscriminately. Another peculiarity of farm-yard manure was that it exercised beneficial effect on plants, not only supplying direct food to them, but producing a highly beneficial mechanical effect on the soil, especially on stiff clay land. He was a strong advocate for long dung being applied as soon as possible. In the yard manure one great peculiarity was the large amount of water—in fact, this amounted generally to 66 per cent, and in rotten it amounted to three-fourths of the whole bulk; so that for every ton of active manuring matter, the farmer has to cart three tons of useless materials, even supposing that the remaining ton is composed of nothing else but valuable fertilizing constituents. This would explain why it was that artificial manures were especially adapted for hilly districts, and for fields removed a considerable distance from the farm-yard. He did not think that farmers always took a sufficient account of the wear and tear of horses and men in the transit and application of that manure. If the subject were carefully considered, the farmer would think twice before he carted a heavy load of farm-yard manure some eight or nine miles from a town, and afterwards applied it to a remote field on the farm; and he would also hesitate before producing farm-yard manure at any expense. Under some circumstances, which every farmer ought to know best for himself, feeding cattle did not pay at all; farmers sometimes made up their minds to feed at a loss, calculating on something for the manure. But it was a very delicate question whether this was the best way of producing manure, or whether it was not better to use the ordinarily-made manure, and apply it in connection with artificial or special manure, the latter term showing that it was adapted for special purposes. If a farm was not in good order, it ought to be brought round by general manure, such as farm-yard manure; but when it was in better condition, to make it go as far as possible, special manures must be resorted to. A peculiarity in artificial manures was that they supplied special fertilizing ingredients, to the exclusion of some others which were abundant in farm-yard manure. For instance: In the best Peruvian guano, there was a high per centage of ammonia, with about 20 or 25 per cent of phosphate of lime; and that guano was applied for getting an additional crop of corn. Some other artificial manure—bone dust, for instance—were valuable on account of their containing phosphate of lime, which was

favourable to the production of roots, nothing tending to the rapid development of bulb so much as that. He did not mean that phosphates were of no use to corn crops. In some soils they produced a marked effect, and he had that morning recommended a gentleman to use superphosphate by way of a trial, to keep up his wheat. There had been a good deal of talk about a deficiency of silica in soils, which prevented corn from standing up. It was remarkable that soils peculiarly liable to corn lying down, generally contained a high per centage of silica. From observations that had been made on the subject, he was inclined to think that what had been said about silica must be regarded more as a theory rather than a resting on well-ascertained facts. It had not yet been ascertained how it was that some crops were stronger than others; and until that was found out, it was of no use reasoning upon the matter. Corn became laid down from a variety of reasons. If the land contained a supply of all the elements necessary for the growth of the plant, a dressing of guano produced a course wheat, which often became laid down. When wheat became laid down, it arose from something in the soil being in too large proportion. Some people had a curious way of estimating the skill of the farmer by the amount of the manure which he put on his land. Some men were content with eight tons of farm-yard manure, while others used as much as twenty tons to the acre. The farmer, however, who tried the larger dose, did not often repeat the experiment, for he became convinced that, in farming, what was good in one instance was not good in another. The great advantage of artificial manures was that they contained special fertilizing ingredients to the exclusion of other substances, and hence its adaptation to special circumstances. How were these special circumstances to be ascertained? He had no doubt in his own mind that bone dust or superphosphate, mixed with farm-yard manure, would be of great advantage, as it would supply the element which was very much deficient in farm-yard manure, especially where the manure was produced by young and lean stock, which absorbed all the phosphate of the food; in the manure from fattening animals, there was a large proportion of this substance, and hence its great value. Phosphates, generally speaking, were more suitable for root crops, but it was impossible to lay down general rules; the farmer himself ought to be the best judge, whether in order to obtain a good crop anything else was required. Turnips did not live alone upon phosphate; they required a variety of other substances—lime, soda, potash, and other fertilizing matters. It depended upon the farmer to find this out, and no one else. There was a good deal of land in this part of the country which required nothing more, in order to obtain good root crops, than bone in an efficient state of preparation. The learned professor then went on to observe upon the constituent parts of guano and superphosphates and their application to particular soils and for particular crops. [The substance of this part of his lecture will be found in our report of the Wenlock Farmers Club.] He illustrated the immense importance of examining the manure we buy, by referring to the following table, which proved that some superphosphate contained four times as much valuable fertilizing matters as others :—

COMPOSITION OF SUPERPHOSPHATE OF LIME.

	I.	II.	III.	IV.	V.	VI.	VII.	VIII.
Water	19.26	20.53	14.40	22.03	20.37	8.91	10.80	26.89
Organic matter	16.10	14.76	8.93	trace.	25.71	..	4.21	2.08
Soluble phosphate of lime	6.38	10.31	3.60	8.55	5.92	25.70	20.28	14.78
Equal to bone earth	(9.94)	(16.09)	(5.61	(16.33)	(7.37)	(40.11)	(31.63)	(23 06)
Insoluble bone phosphate	22.16	17.72	6.83	..	1.50	6.68	4.11	5.58
Hydrated sulphate of lime (gypsum)	25.10	28.39	44.20	24.42	40.16	43.05	46.63	43.60
Burnt gypsum	..	..	..	40.43	..	12.38	..	..
Alkaline salts	5.16	1 56	2.52	2.41	2.93	.96	10.78	1.18
Sand	5.82	6.73	19.50	2.16	4.23	2.32	3.19	5.26
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Per centage of nitrogen	1.66	8.53	1.44	.17	1.11	..	.34	.21
Equal to ammonia	2.01	1.065	1.75	.20	1.42	..	.41	.25

Mr. George Davies, as a farmer, was much obliged for the able and practical lecture which they had just heard. He wished to know if the learned professor could tell him how red clover could be retained on light soils from January until June. He had some years ago

conversed with Dr. Pepper on the subject, and was now in communication with Mr. Nesbit, but the latter gentleman had not answered the question he now put.

Dr. VOELCKER said, this question was a most important one, which it would be most desirable to solve. About four years ago, he paid some attention to what was called "clover-sickness;" and, like most beginners, in two mon hs he fancied he knew something about the matter, and threw out some suggestions, with a view to remedy the evil. Having, however, followed up the question in various operations, and in the laboratory, and after some long correspondence, he had come to the conclusion that, upon the subject of clover-sickness, he knew as much or as little as the man in the moon.

Mr. DAVIES asked if the fermentation of ordinary manure would render chipped bones sufficiently soluble to be of use to the crop?

Dr. VOELCKER thought it would be quite sufficient; and, after one turning, the bone-dust would disappear. It would, in his opinion, be a very great advantage to use bone-dust in that way.

Mr. PAYNE inquired if the Professor recommended long manure to be ploughed in, or used as a top-dressing?

Dr. VOELCKER said, in a very stiff land it would be better to plough it in, as in that way they obtained the full advantage of the manure.

The CHAIRMAN, in the course of some observations, asked if the plan recommended for keeping up the wheat was by stiffening the straw? If so, superphosphate would be much more likely to do that than ammonia.

The PROFESSOR said he knew, in some instances, that superphosphate stiffened the soil; but that was a different thing from recommending it for the purpose of stiffening the corn. Ammoniacal manures certainly had a tendency to make corn go down, and should, therefore, be used very carefully.

Mr. GEORGE DAVIES then moved, and Mr. GEORGE WATTON seconded, a vote of thanks to the lecturer, which was cordially carried and acknowledged.

THE PROGRESS OF AGRICULTURE.

(From the Mark Lane Express.)

Forward! forward! was the watchword of one, who for a quarter of a century held almost the whole of Europe in abject submission to his iron will. In taking leave of the old, and welcoming the new year, we shall use this signal in a far different and more beneficial sense—that is, if to promote the welfare of mankind, and render the means of subsistence more abundant, and consequently more accessible to the masses, be preferable to spreading misery and destruction among them. We apply it to the progress of agriculture, and call upon the cultivators of the soil to adopt it as their principle of action—not to rest satisfied with past attainments, but to bear in mind that the extent to which improvement may be carried is indefinite, and that every fresh advance in its career opens up new sources of power.

In the cultivation and general management of the land a great advance has been made. Twelve months ago the subject of steam-ploughing was warmly debated, and many practical men were of opinion that, owing to physical impediments, it never could become of great utility. We, however, then spoke of it as a prospective victory; and its practicability has since been demonstrated by Fowler, Boydell, and others. The American reaper and the thrashing machine have received important improvements at the hands of various machinists. The general labour of the farm has been facilitated and rendered less onerous and expensive by the modern improvements in implements, long in use. And thus the processes of husbandry, aided by the machinist, have been largely accelerated.

The management of the land, too, has occupied the attention of agriculturalists; and if the vexed question of deep and shallow drainage is as unsettled as ever, the *general principle* it far better understood. It is by collision that sparks are produced from flint and steel, and it is equally by the collision of opinions that truth is elicited. When practical men cannot agree upon such points, a Way or a Nisbet steps forward, and by laying down general rules, and applying the principles of science to the subject, goes far towards showing that both may be right; and that the difference of opinion may

arise from a want of considering the different conditions of the soils, situations, and other elements of the land to be operated upon.

In the productions of cereal and other crops, a great improvement has been effected by the more general and increased application of chemical manures, the nature and value of which have been defined and explained by our agricultural chemists. To apply the right manure to the right crop is as necessary on the farm as to have "the right man in the right place." Science if not yet understood by farmers generally, is now appreciated by *all*, and an *anti-book* farmer would find himself as much out of place at an agricultural gathering as an Anti-Bakewell Leicester sheep, or an Anti-Colling's shorthorn. Under the new system, cereal crops are now produced to an amount which no man would have credited fifty years ago; whilst no one now believes the maximum of production has been reached.

In the breeding and grazing departments of the farm, if there was not much room left for material improvement at home, we have the satisfaction of knowing that the character of our British breeds of animals has excited the spirit of emulation abroad. Large purchases of breeding cattle and sheep have been made by foreigners at fabulous prices; whereby English breeders have reaped an additional and somewhat unexpected advantage from their efforts. Thus, the Bakewells, the Collings, and their successors have proved benefactors not only to their own country, but to every civilized nation on the globe. The British races of Shorthorns and Devons, of Leicesters and Southdowns, have now acquired a world-wide extension as well as fame.

But, whilst the material prosperity of the agriculturalist has been thus largely promoted by the improvements effected in every department of the farm, what has been the case in regard to the mental progress of the farmer himself? Has he become convinced at last, that "knowledge is power," and that an understanding enlightened by education is safer to trust to, or be trusted, in any employment, than even "the wisdom of our ancestors?" If we may judge by the manner in which a great number deliver themselves at public meetings, we should say decidedly that a vast improvement has taken place in this respect, and that the present race of farmers are as superior to the last generation, in education and manners, as the implements they now use are superior to those of the last century. In fact, the education of the farmer is now a physicial as well as moral necessity. Without it, half the material changes in agriculture would be rendered nugatory by the want of skill and knowledge to avail themselves of them. Still, we want a few more Nesbits distributed throughout the country, to demonstrate the superiority of scientific knowledge to that resulting from mere practice. We must confess that we are in a transition state at present, and must look to the rising generation for that full and general development of mind—destined, as we firmly believe, to convert the farm into a chemical laboratory, and the farmer himself into a man of science.

COLIC IN HORSES.

Years ago, before nosebags were generally adopted, colic was more common than at the present day. In those days horses went out to work early in the morning and did not return until night, during which time, "owing to the want of some convenient mode of supplying them with food when out," they partook of none. The consequence was, they returned home with their vital powers exhausted by work, and with keen appetites, bearing no relation to the capacity of the stomach or to the digestive powers; with avidity they swallowed the food then placed before them; it then entered the stomach not sufficiently insalivated or masticated, rendering it impossible for the grastic juices to act on it, it is a physiological fact that, if food is not properly saturated with saliva in the mouth, it is with great difficulty that chemical action necessary to digestion is set up in the stomach—and colic was the result.

To remedy this evil, Professor Coleman suggested the use of this nosebag, in order that the horse, when standing during the loading or unloading of the vehicle to which he was yoked, might partake of food. The nosebag being generally adopted, cases of colic became rare, and happily continue so.

The horse has a very small stomach when compared with the rest of the alimentary canal, which is quickly emptied, and therefore requires to be frequently supplied with food. From the above remarks, we learn that it is better to supply animals with a small quantity of food two or three times a day, in preference to a large quantity at one time. This plan I have

proved over and over again to be a good practice ; but, with all our care (sometimes owing to the exhibition of an improper quantity of deteriorated food, as bran, turnips, &c., or to a draught of cold water when the animal is heated—rarely, however, causing this disease unless in co-operation with other agents, as the effects of water are but transitory without them), some animals have periodical attacks. When such is the case, I always imagine the animal is the subject of intestinal calculus or calculi. The disease, therefore, often consists in indigestion and stoppage of the bowels.

Diffusible stimulus, as sulphuric ether, should be given combined with a sedative, as opium, followed by the administration of 5 drams of aloes, with enemata, in order to evacuate the bowels, which are usually constipated. Blood-letting is superfluous and generally injurious.

Bran should never be given to horses except in the form of a mash. If given dry, it becomes impacted in the intestines, and forms a stoppage to the passage of the ingesta.—*Field.*

GRASS.

A writer in the *Valley Farmer* says :—

It is the design of this article to gratify the spirit of inquiry as far as possible, and aid in the introduction of an article which must become one of its staple productions. We have now had the experience of another season on a large scale, and we can now speak with confidence ; there can be no longer a doubt about the superiority of Hungarian grass as a *hay* crop over everything ever tried upon the western prairies.

In the spring of 1853, as nearly as I can ascertain, a Mr. Gleason brought a small quantity of this grass seed with him from Illinois. He had procured a handful of it the spring before from a Hungarian exile who was passing through the country. What became of the exile or the balance of his seed, I cannot learn, nor yet the name of one who has conferred such a favour upon the people of the great west. His name should be written in letters of gold ; for that little handful of seed is destined to change the agricultural character of a dozen of States, and give us a product which will stand second only to the *corn* crop upon the rich prairies of the advancing west. This poor exile, and Mr. Gleason with his handful of seed, have done more to promote the agricultural interests of these prairie States, than the Government has with all its seeds in the last ten years. They have done so, because they have given us an article completely adapted to our soil and climate, and one which we needed above all others. This may sound like enthusiasm, but it is a sober reality. We have now in this region, the *best hay country that I ever saw*—until this season and last it was the *worst*. The common grasses are a total failure, yet we have hay of the best quality in such overflowing abundance, that we can feed seven months and still have hay to sell, and this hay was grown upon the high, dry prairies at the rate of three or four tons to the acre.

Mr. Gleason sowed his handful of seed in Illinois, and the next season brought the product to Monroe Co., Iowa, where he sowed again. It may be well to observe that he had difficulty in procuring a piece of ground, as farmers were afraid it might somehow ruin their land. The next season, which was 1854, he distributed among such of his neighbours as had overcome their fears. This year it began to attract some attention in the vicinity, and its popularity has increased as fast as the little handful of seed has multiplied itself. Those who have seen it every year since the first was sown, are now better pleased with it than ever—this year's crop exceeding all that went before it. Within the little circle of its present production, its popularity is unbounded.

In my article last spring, it was stated that a Mr. Bates was the first to introduce it, but a closer investigation traces it beyond him to Mr. Gleason.

I have thought best to secure these facts while they were within reach, because a great effect is destined to flow from this small beginning, and when the little stream becomes a great river, the world will wish to know in what secluded fastness the head spring is situated.

This grass is a crop which has never failed. Wet or dry—cold or hot—it has been a good heavy crop ; even last season, when that sturdy giant, the corn, dropped his strong arms, and rolled up his green banners in the dry, hot blasts, his more humble neighbour, the Hungarian grass, spread its rich green mantle over the parched soil, and shot up its luxuriant blades, and waved its golden heads triumphantly, in spite of dry winds and rainless skies. In point of certainty, we have no crop which compares to it ; it seems to be exactly adapted to our

loose, deep prairie soils, and is, perhaps, a better crop in Iowa than in its native soil in the country of the Magyars. The secret of its success lies in its strong vitality, stout roots, and adaptation to a dry soil. The roots of our common domestic grasses are too short and slender to reach below the influence of our dry, hot summers, while this production, from its greater vigour and larger roots, can pierce below the reach of drought, and draw up the treasures of fertility which lie beneath.

The only objection which can be urged against it, as a hay crop, is that it must be put in every year; but the immense yield, certainty and nutritive qualities more than compensate for this disadvantage; it is not at all likely that we will soon find a perennial grass which will at all compare with it in these particulars.

In appearance the Hungarian grass resembles Millet, and it no doubt belongs to the same family; but it is much more productive; it affords a better provender, and the seed is more oily and nutritious.

As hay it is superior to Timothy, that old and substantial favourite of every farmer, Horses changed from Timothy and corn to Hungarian grass, begin to thrive on half the usual allowance of corn, and put on that fine glossy coat so much admired by stock growers.

It is not the *hay* alone which gives value to this crop; it produces *seed* at the rate of twenty to thirty bushels to the acre, which in nutritive qualities is much superior to oats; it is heavier, and contains a large amount of oil. In truth the crop is better than a crop of oats and Timothy put together.

The production of this crop is as yet mainly limited to the east half of Monroe county and the vicinity, in which it is supplanting both oats and Timothy, and is reducing the quantity of corn. Farmers are beginning to turn their attention more to cattle than hogs. Up to this time the county has taken up all the seed, "and cried for more," but this season there will be enough to supply the home market and leave a surplus to send abroad—at what price is not yet settled. Farmers here would not be tempted to part with their own supply for ten dollars a bushel.

As an evidence of the popularity of this crop it may be mentioned that the price of seed has steadily advanced for the last three years, notwithstanding a bushel will sow three acres, and produce 25 bushels to the acre.

In the spring of 1855, it could not be sold at any price, except by the quart or gallon; next season the price was $2 50, and last season it started at the same, but soon reached $3 00, then $4 00, and next $5 00 with the supply exhausted, although there was no demand for it outside the circle of its growth.

"ALSIKE," OR PERENNIAL HYBRID CLOVER.

(*To the Editor of the Agriculturist.*)

Having had enquiry made by several of my frends, who were aware of my having cultivated the "alsike clover" for several years, and believing I am the only one who has done so in Canada, I wish, through the *Agriculturist*, to draw the attention of farmers to this new and admirable variety of the *trifolium.*

The alsike clover is indigenous to Sweden, where it has been cultivated for the last century, and has in some cases been known to grow to the height of four feet; but in England, Scotland, and *in Canada,* about two and a-half feet may be the average height. The root is fibrous, and the heads globular, The plant bears a greater resemblance to the white, than to the red clover, and although its stems are recumbent, they do not root into the ground like those of the white clover; in short, it may be described as a "giant" white clover with flesh coloured leaves. It will yield in the old country two mowings annually, but in Canada one mowing, with a heavy second crop for pasture, will prove the most profitable course to follow.

Linnæus observed the alsike clover growing on poor, bare, obdurate clays in the Morea, where no other plants could be made to vegetate ; and yet under such unfavourable circumstances, this clover flourished with an uncommon luxuriance, and yielded shoots as tender and succulent, though not so abundant, as if reared in the most richly manured fields.

Sturm says it is found in Holland, and that he has tried its cultivation, along with that of a great number of other clovers placed under the same circumstances, and the result convinced him that there is no other kind of clover equal to it for the purposes of cattle feeding. With these remarks I most cordially concur. Both sheep and cattle are so fond of it that the common clover, or Timothy and clover mixed, are quite disregarded if access could be forced to the alsike, both as pasture and hay. The common red clover will last only two years in perfection, and often if the soil is cold and moist, nearly half the plants will rot, besides its liability to be thrown out or winter killed, and in the second year bald patches will be found in every part of the field ; besides that, in September and October many crops left for seed are lost, in consequence of the heavy rains during that period, while the alsike clover, on the contrary, ripening its seeds perfectly *the first crop*, and continuing its vigour much longer, much risk and expense are avoided, and a larger profit accrues ; and when this plant is once established, it will remain for many years in full vigour, and produce, annually, a great quantity of herbage of excellent quality. Four years ago I obtained from Messrs. Lawson, of Edinburgh, five pounds of seeds, which I sowed to one acre, and as I was cautious in my experiment, mixed it with about two or three pounds of Timothy. It stood the winter admirably, and I cut the following year certainly *not less* than *three tons* of the finest clover hay I had ever seen. In the end of June, and before ripening its seeds, I expected to have the second crop run to seed, which it did not, but produced an unparalleled mass of feed, so close and even and about one foot in length, that I could have fancied it would bear one up to walk over it. The second year I had an equal quantity mixed with Timothy, and I found the clover, when the seeds ripened, to suit the time for cutting the Timothy exactly, without blackenning and going to waste, as the common red does. I consider this as its *greatest* recommendation, for we all know well, that red clover and Timothy, the usual mixture sown, is on account of the inequality of ripening but ill suited for producing an abundant crop of *first class hay*, as the one or the other must be partially sacrificed. The third cutting last year was heavier than either of the former, such as only a first rate machine (Manny's) could have given the *coup de grace* to. By shaking I got as much seed as has covered four acres with as fine a plant, and as thick as can be expected, and I feel confident in taking twelve tons of hay from the piece this year.

Mr. Fleming, the Agricultural Society's seedsman, has procured a small quantity of seed from Britain, and has my order for all I can sow this spring I have advised, privately, some friends to order from him at least as much as

will sow one acre (4 lbs.,) and give it a trial ; I now desire to give my views regarding it, a much wider circulation, and if I can only persuade 100, or even 50, *intelligent* farmers to make a trial of an acre, or even half, and report their success to you, I feel confident that red clover, both as a mixture with Timothy, and for forage by itself, will soon be numbered among the grasses that were in Canada, and am vain enough to believe, if spared ten years, that it will be generally acknowledged I have done some good for my adopted country. Mr. Editor I beg of you, as you are more able than I am, to draw attention to this subject. Don't let it die away as the dream of an enthusiast ; I am a practical man, and the number of years which have elapsed since I first got the seed from Scotland, must be held as a proof that my views have not been forced on the public until I was myself *thoroughly convinced.* I give my name to your readers without fear, believing it a much better system than the *sub rosa*, where a mere theoretical tyro may, by a superior faculty in the art of composition, throw dust in the eyes of a common sense farmer by *almost* persuading them that turnips *is* but *improved potatoes.*

Yours, respectfully,

PATRICK R. WRIGHT.

Cobourg, Feb. 1, 1858.

WESTERN N. Y. FRUIT GROWERS' SOCIETY.

The annual meeting of this important Society, was held at Rochester, N. Y., during the last month, Several points of great interest to fruit growers were discussed at this meeting, and as some of the most extensive nurserymen, and most intelligent cultivators of fruit took part in the discussion, we think our readers will be interested and instructed by a perusal of their remarks.

The first question discussed was—

1. What Soil is Best Adapted to Produce the Apple in its Greatest Perfection ; both Tree and Fruit?

L. F. Allen of Black Rock, thought there were several varieties of soil adapted to the growth of the apple. From the extremes of Canada, to the cotton growing districts of the South, the apple will succeed. It is not hard to please, either in soil or climate. Had he the opportunity, when planting an orchard, of selecting a soil to his liking, thought he could select one in which both tree and fruit would succeed. Still, others might select a different soil and do well. He believed that Western New York, from the Niagara River, (below the falls,) to Syracuse, was the best fruit growing district in the United States. He could also speak favourably of portions of Canada West, Northern Ohio and Eastern Michigan, but for excellence—*concentration*—of flavour, none equals Western New York. As we go South and West, and find richer soil or a warmer climate, the fruit becomes larger, but poorer—*diluted.* Apples may be said to be local in their character. A fruit is generally better where it originated than anywhere else. The Esopus Spitzenburgs raised in other parts of the country bear no comparison to the Spitzenburgs of Ulster county ;the Newtown Pippin is nowhere so good as on the Hudson River. Our Rhode Island Greening is not the *Greening* as it grows in Rhode Island. Soil, temperature and other causes so affect the character of fruit that varieties, excellent in one locality, are almost worthless in others. Mr. A. had seen apples grown in perfection on a good loam, on stiff clay, and almost, on a blowing sand. Cox, the old pomolgoist, described his orchard as a moving sand, and yet he raised the Newtown Pippin, the Vandervere, and other good sorts in perfection. He had seen excellent orchards on the poorest granite soils of New England. The apple seemed designed by Providence as the general fruit of man.

L. B. Langworthy, of Monroe Co., inquired if Mr. Allen had noticed that particular varieties required a particular soil to bring them to perfection.

Mr. Allen thought there was something in that—some sorts seemed refractory. They refused to give their excellence unless grown in a peculiar soil; perhaps similar to that in which they originated.

Mr. Spence, of Yates county, thought that the apple could adapt itself to almost any soil, and that climate had more to do with its growth and perfection than was generally supposed. We may prepare soil in the best possible way for foreign grapes, and they will not succeed, but as soon as we cover them with glass, so as to make a different climate, we grow them in the greatest perfection.

E. H. Hooker, of Rochester, considered the question to be, not on the best localities for fruit, but the best of the various soils in the same locality. The constituents of the surface he did not consider as important as the nature of the subsoil and the condition of the drainage. Never saw much difference in apples from difference of soil, but the fairest is oftentimes from sandy soils. Had always found the best orchards on land with a good natural drainage.

P. Barry, of Rochester, considered the question to be, not on what soils will the apple grow, but which is the best for it. Light soils would produce good fruit, but they require constant and heavy manuring. Dryness of bottom is important, in fact, it is indispensible. If the root is in water it becomes cankered, and the tree destroyed. Would prefer a well-drained clay loam for almost all fruit trees—even the peach would grow stronger and live longer on such a soil than on the more sandy, if the subsoil was dry. His ideas of the changeableness of the character of fruit by soil and climate had been greatly modified of late: even the Fameuse, which he and others had considered almost worthless at the West, he had seen in Southern and Central Illinois, large and fine flavoured. The Pome Gris he had found excellent in Central Illinois, as well as the Newtown Pippin, and the Esopus Spitzenburg as fine as ever grew on the Hudson.

H. E. Hooker had received Newtown Pippins from St. Louis as fine as he had ever seen—large and good.

J. J. Thomas, of Union Springs, thought we gave too much importance to the local character of the apple. He had seen fine Newtown Pippins, grown in Cincinnati. The Ohio Pomological Society recommends thirty sorts for general cultivation in that State, and they are, all but four, varieties of Eastern origin.

Mr. Allen had tasted the Western fruits with some of the gentlemen present, and they did not then express opinions of their excellence as confidently as now. In the Cincinnati market you will find almost all the fruits exposed for sale are local varieties, or acclimated, such as the Willow Twig, or Yellow Bellflower, which he had seen almost as large as pumpkins. It is so in all parts of the United States, some local fruit is the favourite, and most generally found in market. Believed with Mr. Barry; but a soil naturally dry—drained by the Almighty — is what is needed. Land, artificially drained, would not do as well for an orchard as that which was naturally dry. Would not depend upon tile, which might become choked by any mischievous rat. Would rather trade off an unsuitable farm then attempt to drain it for the purpose of raising fruit.

H. E. Hooker agreed with Mr. Allen. Had an orchard on a wet subsoil, a springy side hill, and has tile-drained it, but never picked a peck of good fruit from it, and did not expect to.

T. C. Maxwell, of Geneva, was surprised to hear the idea advanced by the two last speakers that draining was a poor investment. His experience was the opposite of this.

Dr. Spence was sorry to see draining underrated. It would pay well, and as much so for orcharding as for farm crops. Draining, whether natural or artificial, is upon the same principle and produces the same results—the removal of surplus water from the roots. Have drained orchards with a wet subsoil, and with the most desirable results.

J. Vick, of Rochester. thought that before any inference could be drawn from the experience of Mr. Hooker, or any argument founded upon it, he should tell us how his land was drained. It may be drained thoroughly, or it may be only half-drained—a mere apology for draining, from anything that we know.

Mr. Barry—that is the question. Perhaps Mr. Hooker's land was no better after what draining *it* received than it was before. The draining of springy side-hills has always been difficult. How best to cut off the springs was a question that excited the most earnest discussion throughout England, and perhaps but one man had learned to do it well.

R. R. Scott said that Smith, of Deanston, had taught the true way of draining such side-hills, by running the drains across, and thus cutting off the spring at any point.

Mr. Hooker had drained down the slope, and the tile were in some places 4 rods apart, while in others, where draining did not seem to be so much required, they were 10 rods and more apart. The surface of the land is broken, so tnat it was found impracticable to lay the drains in straight lines or at regular distances, or of uniform depth.

P. P. Bristol, of Dansville, had been much interested in the discussion, but land could not be considered drained suitable for an orchard because tiles were laid through it at certain distances, without reference to the peculiarities of soil, situation, &c. Drains should be laid close enough to do their work well no matter what the distance required may be. Has an orchard on the border of Cayuga Lake that was in a fine bearing condition for several years and until the present high water in the lake. This orchard is now only two feet above the level of the lake, but previously, when the lake was at its usual height, it was from six to eight feet above. Many of the trees are dead and the remainder are in a dying condition As the only apparant reason for the destruction of this orchard is the saturation of the earth with water, it seems evident that if this water could be removed the land would be restored to its former fertility. Here, then, we have a fact showing the advantage of underdraining for orchards.

This subject was continued to some length, but nothing of especial interest was suggested,

2. Best Soil for the Pear, Peach and Cherry.

H. E. Hooker would prefer for the pear a strong clay soil, drained; but had seen the pear do well in situations quite damp. Had not noticed any difference in regard to blight from difference of soil.

L. F. Allan thought the pear a very capricious as well as delicious fruit. Think we are a good deal in the dark about its cultivation. Had invested more dollars in pear culture than he cared to name, and the balance was always on the debtor's side. The old pear trees at Detroit, which are now about 100 years old and flourishing, stand in a *clay loam*. Many of these trees are from 50 to 60 feet high and large and symmetrical, bearing from twenty to sixty bushels of fruit every year. On the Canada side of the Niagara river, near Queenston, are hundreds of old pear trees which were planted at the time of the Revolution by Tory settlers from the States with seeds which they brovght with them from New Jersey and some other parts; the soil is heavy and the trees are in a flourishing condition, and unaffected by the blight—few of the apple trees then planted now stand. Some of these trees owned by an acquaintance of mine, I induced him to graft with scions which I let him have from my garden, among which were the Marie Louise, Glout Morceau, Bartlett, Winter Nells, and one or two other varieties; he grafted them thirty feet high, and they now bear splendidly. The soil where these trees stood is a heavy clay; on the opposite side of the river, in a lighter soil, many pear trees have blighted.

P. Barry said the *Peach* required a dry soil. A good, substantial, dry loam was best for both tree and fruit. The *Cherry* is impatient of moisture. A dry, loamy soil is best, though it will succeed in a clay loam, if dry. In answer to an inquiry, Mr. B. recommended for family use Early purple Guigne; Belle de Orleans, a light variety, not troubled by birds; Governor Wood, a very fine and hardy variety; Black Tartarian; Black Eagle, and Reine Hortense, large and hardy. For a very late sort he would recommend Belle Magnifique; and for market he would add Napoleon Bigarreau, Rockport Bigarreau, and Ekhorn, or Tradescant's Black Heart.

Dr. Spence found the cherry to be particularly injured by moisture. He had an orchard of fine bearing cherries. Last year one of the under-drains became stopped, and the consequence was many of the trees turned yellow, and finally died. The soil a clay loam, and when drained, admirably adapted to the cherry.

H. N. Langworthy, of Monroe County, had grown the cherry on light sandy soil, such as is usually called here oak openings, for 20 years, with excellent success.

II. 1. Can the Cultivation of the Grape on an extensive scale be made profitable? 2. What Varieties are best adapted to Western New York?

Mr. Barry said that the Isabella was the only variety of an established reputation that he would be willing to plant exclusively. Several new varieties are claiming attention, and promise to become very valoable acquisitions.

L. F. Allen agreed with Mr. Barry that the Isabella was the only one sufficiently known

to recommend, but expected that in a few years other varieties will prove far better than that. The Isabella will not ripen in one locality out of ten. Hundreds of pounds of unripe Isabellas are sold in our markets a every year. On the Hudson River, at Croton Point, it is fine, and also in some favonred localities in Weestern New York.

Dr. SPENCE thought the Isabella would ripen in very many places in Western New York. It will ripen along the shores of Seneca Lake as well as at Croton Point.

H. E. HOOKER could not unqualifiedly recommend any grape for general cultivation, though he thought the Isabella the best for this climate, and would succeed in many localities. Thought favourably also of the Diana.

W. B. SMITH, of Syracuse, had no difficulty in ripening the Isabella. It bears large crops of fine fruit, and for one, he was satisfied with it.

J. J. THOMAS said the Isabella would succeed at all places, but in many it does well. We can recommend this variety for favourable, warm situations. Last season was very cold, and unfavourable for ripening the grape, and yet within a mile of his residence is a vineyard where the fruit was thoroughly ripened.

T. C. MAXWELL would recommend the Isabella. Saw beautifully ripened specimens from Bloomfield last season, although the season was so unfavourable.

Mr. PECK, of Bloomfield, has a vineyard of 100 vines, which last season bore seventy-five bushels. Sold six hundred pounds last fall in Buffalo, at 15 cents per pound. Last year sold a quantity in New York at 22 cents per pound. Would recommend the Isabella for general cultivation in Western New York. His land is a clay loam, naturally dry, descending to the north and east, and shaded on the south by an old orchard. With good cultivation the Isabella will ripen in all seasons, and in most locations. The difficulty is, people neglect their vines and then charge the evil to climate and situation.

3. CAN GRAPES BE PRESERVED IN A FRESH STATE FOR A LONG TIME AND IF SO, IN WHAT MANNER?

Mr. PECK observed that there was no difficulty in keeping grapes that were thoroughly ripened. When grapes become ripe the stem cures, or shrivels, and the fruit keeps plump. After picking and selecting the fruit, put them in half barrels, sawed in two for the purpose. Baskets are not stiff enough, as they give on being moved, and bruise the berries. Keep them in an upper room until the first of March. Pack them for market in boxes, holding about six pounds. Have sent them to Iowa by express with safety.

W. B. SMITH packed grapes in tight boxes between batting last year and kept them until the 10th of June. They were of good flavour, although a little musty from the cotton.

C. P. BISSELL had kept them until March in the way described by Mr. Smith.

L. F. ALLEN said the grapes of commerce came to us packed in dried saw-dust. They were evidently packed before becoming ripe.

Mr. PARSONS had some experience in preserving grapes. For the last 11 years had kept grapes until the first of April. Generally put up about 10 bushels. First commenced putting up in tight box-s which he kept in a chamber, but after about two months they wilted, and were useless. Next season used batting and more care in packing, but not sufficient to keep them. A few bruised grapes will spoil a whole box. Next, got tight boxes and placed cotton batting at the bottom, covered with a cloth. Pick on a dry day, remove all bruised berries, clean from any dust, and put about four layers carefully into the box. Put on the cover and allow the box to remain in the garret where the thermometer is often down to zero. In this way they keep free from mold and all bad taste, and retain their flavour. Great care must be taken in handling, so as not to bruise them.

Dr. SPENCE said that vegetable physiology shows us that the juice of grapes is not contained in one sack, but in separate divisions and delicate cells. Whatever method is adopted for preserving them it is necessary that they be kept from being bruised, or these cells will be ruptured. Generally kept grapes in boxes, between cotton, in the garret, until very cold, and then in the cellar. At first failed, but soon learned to handle them carefully, and now succeeds.

Mr. FOWLER thought freezing did not injure grapes.

Mr. PECK observed that when the stem was dry and shrivelled, showing that the grapes were ripened thoroughly, frost would not injure them, but when unripe they were injured by frost.

4. What is the best Method of Pruning and Cultivating the Grape?

Mr. Peck, of Bloomfield, gave his practice of pruning and cultivating the vine as follows:—Commencing by planting a vine two years old, I let one cane grow the first year, and in the fall cut it back to six inches from the ground; the next season I grow two horizontal canes, one each side of the stem, letting them run about six feet each way, and then pinching them off; the next year, from these horizontal cases I train uprights, parallel to each other, about fourteen inches apart, to the top of the trellis and stop them; the next year I prune off the side shoots to two buds. I practice the renewal system with the uprights. Always summer prune when in bloom. The vines stand 12 feet apart each way with dwarf pear trees occupying intermediate rows, and are cultivated with the plow and cultivator. One hundred vines and thirty-five dwarf pear trees occupy half an acre of ground. The rows run north and south. I obtained this year seventy-five bushels of grapes, weighing, at the rate of forty pounds to the bushel, three thousand pounds. The vines have been planted four years, being two years old when planted. I do not think taking off the leaves to admit air and light, as practiced by some, any benefit, but, on the contrary, an injury.

P. P. Bristol having been requested to describe his method of pruning and cultivating the vine, observed that the pruning of the grape had been practised from the earliest times, as all past experience had shown this to be an essential operation, for the production of good fruit, on account of the tendency, in all the grape genus, to a superabundance of wood and foliage. The question now naturally arises, how much and when the vine should be pruned. Different cultivators have practised different methods. He would confine his remarks to the pruning of the hardy grapes in this climate. As the pruning and the culture are inseparable, it would also be proper to speak of the culture of the vine. Plants from two to three years old, he considered the most favourable for transplanting from the nursery. The ground where they are planted should, in all cases, be underdrained. If the fruit is intended for market and table purposes, the vines should be planted in rows each way, from six to twelve feet distant. Some think that 16 feet is a better distance. Mr. McKay, of Naples, has obtained from one acre of Isabella grapes, standing 16½ feet apart, 11,000 pounds. The proper distance for wine grapes is from 3 to 4 feet each way. My system of pruning is, the first year to cut within a foot of the ground—the second year cut to about 3 feet of the ground, and allow about three buds to grow. The pruning should be done in the fall, or early winter. The wood of the vine is porous, and if pruning is delayed until spring, much of the sap will be lost by bleeding, and the vine injured. Have known vines to die from bleeding. All cuts should be made some distance from the bud—about an inch; if closer the bud will die. The portion of wood left will die and fall off. The Catawba would ripen here if very closely pruned.

For training preferred post and wire trellis, and arrange the vine in the fan form. Summer prune from 20th of June to 10 of July. Take off the wood to within a joint or two of the bunches of fruit. Generally remove about half the wood and half the fruit; that which remains will weigh as much as though the whole were permitted to remain, besides being finer in every way. This year out of 3,000 pounds, had not 3 bushels of imperfect or unripe grapes. Trellises run north and south, are seven feet high, and from experience he would prefer 8 feet apart.

J. J. Thomas had had the privilege of examining some of the grapes grown by the previous speaker, and could testify to their excellent character. Many of them were seven-eighths of an inch in diameter.

5. 1. Is Fall or Spring the best time to Transplant? 2. What kinds do best transplanted in the Autumn, and what if Spring?

Mr. Barry planted from the falling of the leaves until they started again in the spring. Presuming that the soil was in proper condition, did not consider the time important. Would plant evergreens in the spring. Gooesberries, currants, cherries, and other things that start very early in the spring, it would be better to plant in the fall. The mode of planting, however, is more important than the time.

Dr. Spence considered the statement of Mr. Barry very correct for nurserymen, or in fact for any one whose land is always in good condition. Much of our land is clay, and in a wet time is like mortar. Mr. S. preferred to wait until the land is dry and mellow before planting, although he had to wait for this until very late in the spring.

L. F. Allen planted any time in the spring when the ground is dry enough. If trees were obtained in the fall, heeled them in and never noticed any difference between trees obtained direct from the nursery in the spring, or those heeled in during the winter.

P. P. Bristol had planted both in spring and fall, and had always been successful.

WILD GRAPES OF CANADA.

Mr. W. H. Read, sends to the *Country Gentleman*, a drawing of a wild grape, found by him on the banks of the Chippewa Creek, in the year 1855. He says :—" The variety struck me at once, very forcibly, as one of great importance. Its captivating and unusually symmetrical clusters, at first sight carried me quite away. I threw off my hat and coat, and quickly ascended the vine to the height of 80 feet or more, where I could pick at least half a bushel of the most perfect grown clusters I ever beheld. I tasted, and in my loneliness cried out 'Superb!' 'Superb!' responded echo. I ate heartily, and thanked Dame Nature for so great a prize—procured a bundle of cuttings and then started for home. The vine runs through and covers the entire top of two medium sized elm trees, and is, I judge, a full century old—a wilding of great beauty. How it came there no one knows—probably carried by birds from some Frenchman's garden, and dropped in the wood upward of a century since.

"Bunches very handsome, symmetrical, good size, compact, heavily shouldered ; berries medium size ; skin thin, black, covered with a bloom ; flesh tender, melting, without pulpiness, foxiness or musky flavour, sweet and excellent. The wood is strong, short jointed, of a reddish iron color ; foliage very large and thin, green on both sides, having no hair or cotton, and unmistakably shows no kin to the Fox. Important as a parent to cross with foreign grapes, on account of its extreme hardiness and early maturity, as I found it ripe on the 10th of Sept., on the original vine in 1857.

" I will send you a drawing and characteristic of two other wildings, found the present year, of which I took a sketch at the time. A plant of the Chippewa in my garden will probably bear fruit next year ; if so, you may see some of the clusters."

SUGAR FROM THE CHINESE CANE.

THE QUESTION OF CHRYSTALLIZATION SETLLED.

The opportune introduction of the Chinese sugar cane into this country, and the general success in experimental planting, stimulates our agricultural friends in all positions to an extent truly pleasing and surprising. Already we have seen it stated that not less than a hundred thousand acres have been devoted to the cultivation of it in this country the present season. The experiment of manufacturing sugar and molasses from it, therefore, will be tried on a scale sufficiently large to determine the whole question of its value for such purposes. There are fields of it in every State and territory in the Union, and from various quarters, both at the North and South, and even in the far Western prairies of Illinois, says a Chicago paper, they are commencing its cultivation. We hear that the crop is approaching maturity, and that preparations are being made to manufacture sugar. It has been extensively planted in our own State, and some specimens which have fallen under our notice exhibit an extraordinary growth.

It is estimated that these 100,000 acres of the Chinese cane will yield on an average 300 gallons to the acre of syrup, good for table use.

The manufacture of spirit from the sorgho also may now be carried on by our farmers in the winter season, when there is no other occupation for them, at the rate of a gallon of proof spirit for each gallon of fermented syrup. This will find a ready sale at the rectifier's, who will turn it into alcohol for camphene and other purposes. The quantity of alcohol, says a writer well versed on the subject, now used for purposes of illumination alone, to say nothing of varnishes, chloroform, and medicinal extracts, is enormous, and was beginning to have a serious effect on the price of bread, owing to the wholesale destruction of the cereals required to produce it. Now, however, we have found a substitute, which, besides supplying syrup and alcohol, will also yield from the same crop a large amount of forage and grain for the fattening of stock.

But while the grand experiment of sugar growing in the temperate latitudes approaches its culmination, multitudes are still in doubt whether pure, well crystallized sugar can be made from the juice of the Chinese cane. For ourselves, the evidence in the affirmative is entirely conclusive on that point. Such is the verdict of the best French chemists, whose testimony has been recently communicated to the Patent Office, and will be given to the public in the forthcoming report of the Commissioners.

One class of chemists, among whom is a Dr. Jackson, of Boston, have assumed, as the result of their hasty experiments, that only glucose, or grape sugar, could be made from the juice of the sorghum ; but more careful and thorough investigations show that the greater portion of its saccharine matter is crystallizable. Mr. Herey, of France, contends that no uncrystallizable sugar pre-exists in the cane, and that the formation of glucose sugar is only owing to the action of the salts contained in the liquid during the manufacturing process. "Be it as it may," continues the report, "it is certain that the greater portion of the saccharine matter of the juice is crystallizable, and may be obtained in the state of crystals, if, after rapid boiling and filtering, the clear fluid be quickly evaporated, the latter operation being a condition of absolute necessity in sugar making, as, by slow boiling, at a temperature of 112 degrees, or even exposure for a considerable time to a temperature below the boiling point, glucose may be formed from the purest crystallized sugar dissolved in water. On the contrary, if the concentrated solution of sugar be heated beyond 230 degrees of Fahrenheit, it undergoes alteration, and is changed, at least in part, into uncrystallizable sugar, or saccharine mucilage."

Mr. Wray, of London, who is now in attendance upon the National Fair at Louisville, and who has, perhaps, more experimental knowledge upon the subject, than any other man in the world, is quoted as good authority by the Commissioners, on the question of crystallization, and we presume that the experiments which he is now making from day to day will be equally conclusive to the public mind. He has devoted years to the subject, pursuing his investigation in Africa and France, as well as this country, during the present season, and has obtained a patent for his process of sugar making in England.

Assuming, then, that superior sugar can be made from the juice of the sorghum, it is hardly possible to exaggerate its importance as an addition to the crops of the temperate latitudes. Its value was discovered at just the period when the culture of the sugar cane at the South had become a failure, and when also the general consumption of sugar began to outrun production.

The world demanded that by some means, if possible, the supply should be increased ; and, in response to that demand, as if by providential arrangement, the country was supplied with the seed of the sorghum and the imphee, from which we are to have our first harvest of free-labour sugar. It is a great event in the political economy of this country, if not of the world. We pay out annually many millions of dollars for foreign sugar, the crop of Louisiana at best meeting but a fraction of the demand. Last year, it was estimated that the nation consumed not less than 700,000,000 pounds ; and this amount, vast as it is, must continually increase if a supply cannot be obtained. In the Chinese sugar cane, we are now confident that we have the source of an almost unbounded supply. It will flourish everywhere in the Union.—*Carolina Times.*

BUTTER MAKING AND BUTTER.

One of our lady correspondents requests us to give some account of "butter-making"—how and when butter was invented—stating that such information would be interesting to many of onr readers.

The origin of butter-making is unknown. From time immemorial, butter has been made and used by the natives of Western Europe: Little is said about it by ancient writers. Galen and others do not mention it as an article of diet, and it is probable that neither the Greeks nor Romans employed it in cookery, nor set it upon their tables as food, in the same manner as it is enjoyed by us. As butter melts and becomes liquid in 90° Fah., this may account for the ignorance of ancient authors as to its use in cold countries in their day, because the seats of ancient learning were confined to warm climates, and geographical knowledge was then very limited. Through the indomitable courage and enterprise of modern travellers we have been made acquainted with the customs and habits of almost all the tribes and nations —civilized and savage—so that we know of butter being used among many of the barbarous Arab and Tartar tribes inhabiting mountainous regions ; and no doubt it has been known to them for many centuries. The Tartar, carrying milk for his frugal meal in a leathern pitcher slung over the crupper of his saddle, would perceive, after a hard ride, that there had gathered on its surface a rich yellow substance, unknown to him before, and which could have been produced from the milk alone. The cause of its development would readily suggest itself, and its pleasant flavour would incite him to reproduce it in the same manner. This is

the way butter is now churned by some of these nomadic tribes. The milk is placed in a bag made of skin; the Tartar slings it across the saddle, mounts his steed, and trots up his butter. This, we believe, could not have been the way butter was first discovered by the inhabitants of Western Europe, as their most ancient practice of churning consisted in agitating the milk in wooden vessels; but how or when they discovered the art, we shall never know.

In Palestine, and other warm countries, olive oil holds the same place that butter does with us. As an article of diet, we are only acquainted with the butter made from cow's milk; but butter made from the milk of the sheep, goat, buffalo, and ass, are known and used in various countries, especially in Asia. Some tribes of Arabs use the butter (called ghee) of the buffalo, which they drink clarified in a liquid state. In the East Indies there are breeds of goats which give a large quantity of milk; and among the hill tribes of the Himalaya mountains they take the same place as the kine tribes with us. One of these goats, lately brought to this city from Calcutta, (and by a Mormon family, strange to tell!) yielded on shipboard from six to eight quarts of milk daily. We really hope that some of our enterprising agriculturists, who have devoted so much attention to improving live stock, will endeavour to introduce and acclimatize such a valuable breed of animals. They can be raised and fed in mountainous regions where cows would starve. Their milk is good, their flesh excellent, and their hair makes strong and durable fabrics for cold weather. Goats' milk and butter are also common in some parts of Europe.

Butter is the oil of milk, separated by the mechanical action of churning, from its other constituents—casein, sugar, and some salts. It exists ready formed in the milk, as oil does in various seeds, and it can be churned from sweet (but not so quick) as well as from sour milk. It is called by chemists *butyrine* and *butyric acid*. In some dairies the whole milk is churned to obtain the butter; in others, only the cream. By the former method it has been asserted that more, but by the latter superior butter is produced. It is our opinion that with proper care there is little difference in the results of the two systems. Grass-fed kine yield milk from which beautiful yellow butter is gathered; on the contrary, stall-fed cows give milk which yields a tallowy-looking butter. This latter kind of butter is oftentimes coloured to deceive the buyer, by annatto, the juice of carrots, and the flowers of the marigold. The colour, therefore, is not always the test of grass-fed milk. Some kinds of feed impart their strong and peculiar flavour to milk. This is the case with turnips, which should never be given to milch cows, except in very limited quantities. In winter, when grass cannot be obtained, the best kind of food is a question of no small importance. Milch kine should receive, at least, one meal per day of steamed or boiled food. The cheapest and best for this purpose are Indian meal, a few pumpkins deprived of their seeds, carrots, hay, and cornstalks; potatoes are excellent, and when cheap should be given freely. Cows which receive one meal per day of boiled or steamed food, during winter, yield at least one-third more milk than those which receive only dry food, the condition of the former at the same time being much superior.

Much has been said about the best methods of treating butter to preserve it sweet and from becoming rancid. Under ordinary circumstances, there is no difficulty at all in the matter; and yet the quantity of inferior (bad butter) in proportion to good butter, which comes into market, is immensely large. As all healthy, well-fed country kine, produce good milk, no bad butter should be found in our markets. It reflects unfavourably upon the intelligence and thrift of our farmers, that such butter is offered for sale. Cleanliness and care are two of the great secrets for making good butter. Holland butter has the highest reputation of any other; this is simply attributed to the great cleanliness of the people of that country, but there are other conditions also necessary. The dishes containing the milk should be perfectly clean, and kept in a cool, dry, and well-ventilated apartment, and the milk or cream which is designed to be churned should never be suffered to become very sour—to have the least odour of putridity. It has been discovered that butter made from sour cream is very liable to become rancid, in comparison with that made from sweet milk, or sweet cream. It is, perhaps, owing to want of attention on this head, during warm weather, that so much inferior butter is made. It requires longer time to churn fresh than sour cream; but the quality of the butter obtained will pay for the use of horse power to churn, even on a farm having no more than five cows. After the butter has *come*, it requires careful manipulation, or working. It makes it tough to work it over a great deal, and the use of much water for washing takes away its fine flavour. The best plan to treat butter is to submit it first to severe pressure, by placing it in a cloth, and squeezing it in a vessel containing a perforated false bottom. This can be done with a cheese press, if not, with a pounder like that employed

for clothes. After all the milk is thus squeezed out, the butter should be lifted and worked over carefully, and afterwards receive one or two clean, cool waters, to wash away every trace of milk. It should then be salted with the best salt, containing a minute quantity of sugar mixed wth it, and last of all it should again be submitted to severe pressure. The treat object in thus treating butter is to remove all the water and milk from it, because these induce incipient decomposition, and consequent rancidity. By churning the cream before it becomes too sour, and removing all the water and milk from the butter, and by careful and thorough salting and working, the best quality will always be obtained.

THE PHILOSOPHY OF BREAD MAKING.

The following remarks on the philosophy of bread making are from Johnston's "Chemistry of Common Life," a work which contains much useful and interesting information in regard to the food, beverages and narcotics in common use :—

When the grain of wheat is crushed between the stones of the mill, and is then sifted, it is separated into two parts—the bran and the flour. The bran is the outside, harder part of the grain, which does not crush so readily, and when it does crush, darkens the colour of the flour. It is therefore generally sifted out by the miller, and is used for feeding horses, pigs, and other animals, or even for applying to the land as a manure.

If the flour be mixed with a quantity of water sufficient to moisten it thoroughly, the particles cohere and form a smooth, elastic and tenacious dough, which admits of being drawn out to some extent, and of being moulded into a variety of forms. If this dough be placed upon a sieve or on a piece of muslin, and worked with the hand under a stream of water as long as the water passes through milky, there will remain at last upon the sieve a white sticky substance, very much resembling birdlime. This is the substance which gives its tenacity to the dough. From its glutinous character it has obtained among chemists the name of gluten. When the milky water has become clear by standing, a white powder will be found at the bottom of the vessel, which is common wheaten starch. Thus the flour of wheat contains two principal substances, gluten and starch. Of the former, every 100 lb. of fine English flour contain about 10 lb., and of the latter about 70 lb."

When a little yeast is added to the flour before or while it is being mixed with water into a dough, and the dough is then placed for an hour or two in a warm atmosphere, it begins to *rise*—it ferments, that is, swells or increase in bulk. Bubbles of gas (carbonic acid gas) are disengaged in the interior of the dough, which is thereby rendered light and porous. If it be now put into a hot oven, the fermentation and swelling are at first increased by the higher temperature ; but when the whole has been heated nearly to the temperature of boiling water, the fermentation is suddenly arrested, and the mass is fixed by the after baking in the form it has then attained. The formation of hard crusts on the loaf may be prevented by rubbing a little melted lard over it after it is shaped, and before it is set down to rise, or by baking it in a covered tin.

It is now newly-baked bread, and if it be cut across it will appear light and spongy, being regularly sprinkled over with little cavities, which were produced in the soft dough by the bubbles of gas given off during the fermentation. This fermentation is the consequence of a peculiar action, which yeast exercises upon moist flour. It first changes a part of the starch of the flour into sugar, and then converts this sugar into alcohol and carbonic acid, in the same way as it does when it is added to the worts of the brewer or the distiller. As the gas cannot escape from the glutinous dough, it collects within it in large bubbles, and makes it swell, till the heat of the oven kills the yeast plant, and causes the fermentation to cease. The alcohol escapes, for the most part, during the baking of the loaf, and is dissipated in the oven.

New-baked bread possesses a peculiar softness and tenacity which is familiar to most people, and though generally considered less digestible is a favourite with many. After two or three days it loses its softness, becomes free and crumbly, and apparently drier. In common language, the bread becomes stale, or it is stale bread. It is generally supposed that this change arises from the bread becoming actually drier by the gradual loss of water ; but this is not the case. Stale bread contains almost exactly the same proportion of water as new bread after it has become completely cold. The change is merely in the internal arrangement of the molecules of the bread. A proof of this is, that if we put a stale loaf into a

closely covered tin, expose it for half an hour or an hour to heat, not exceeding that of boiling water, and then remove the tin, and allow it to cool, the loaf, when taken out, will be restored in appearance and properties to the state of new bread.

The quantity of water which well-baked wheaten bread contains, amounts on an average to about forty-five per cent. The bread we eat, therefore, is nearly half water ;—it is, in fact, both meat and drink together.

The flour of wheat and of other kinds of grain contains water naturally, but it absorbs much more during the process of conversion into bread. One hundred pounds of fine wheaten flour take up fifty pounds, or half their weight of water, and give 150 pounds of bread. Thus, 100 of English flour and 150 of bread contain respectively—

	The flour contains	The bread contains
Dry flour.....	84	84
Natural water,.....	16	16
Water added, ...	..	50
	100 lb.	100 lb.

One of the reasons why bread retains so much water is, that during the baking a portion of the starch is converted into gum, which holds water more strongly than starch does. A second is, that the gluten of flour, when once thoroughly wet, is very difficult to dry again, and that it forms a tenacious coating round every little hollow cell in the bread, which, coating does not readily allow the gas contained in the cell to escape, or the water to dry up and pass off in vapour ; and a third reason is, that the dry crust which forms round the bread in baking i nearly impervious to water, and, like the skin of a potato which we bake in the oven or in the hot cinders, prevents the moisture within from escaping."

CONCRETE CELLAR BOTTOMS.

The facility and cheapness with which the bottoms of cellars may be made clean, sweet, and impervious to water, is generally but little known to house owners ; nor the ease and certainty with which water may be excluded from cellars where it is difficult to drain.

In soft and pervious soils, this process is best performed by paving with small stones, laid in sand ; but in common, compact soils, the natural surface, well leveled, will answer all purposes. Make a thin mortar with water lime and coarse sand, of the consistency called *grout*, or so thick that it can be poured from a pail on the ground. Commence with a portion of about eight or ten feet at one end, and throw on sufficient to cover it an inch or more thick, and with a scraper or rake-head, spread it evenly and smooth : then throw on as much clean, coarse gravel as it will absorb, and so continue until it is finished. In twelve hours, or as soon as it has set, sweep the overplus gravel evenly on the surface, and ramp it down with a short plank and pounder, until it is smooth and compact, and in a few days of good weather, it will become like a solid rock. It assists its durability and firmness, to give it several good dashes of water after it is dry.

To render the sides impervious to water, where drainage is difficult or costly, requires that the wall should be laid with mortar originally ; and at the time of constructing the bottom, a good well portioned water-lime mortar should be plastered on, a little higher than the source of water, and well and firmly sticked down when about half dry, and followed by another coat of the same ; when, if a proper time intervenes before there is any outward pressure of water, it becomes as tight as a barrel or tub ; it is always sweet, clean, and cool, and no vermin can enter nor find lodgement.

The sand used in the grout and mortar should be coarse, clean and sharp, and the gravel from the size of walnuts down to coarse sand.—*Rural New Yorker.*

Sincerity is to speak as we think, to do as we pretend and profess, to perform and make good what we promise, and really to be what we would seem and appear to be.

The Iron Interest.—The Secretary of the Treasury has issued a circular to iron and ore, manufacture that they may be submitted to scientific tests, in order to ascertain their comparative excellence. Congress has made an appropriation of $2,500 for this purpose. The Secretary also asks for a variety of information in respect to the mines and the processes to manufacture. The facts which will thus be collected will be of great value to the iron interest.

English Travellers and Roman Brigands.—Rome Dec. 5.—The brigands in the neighbourhood of the Eternal City have just resumed their periodical practice of spoliating such incautious travellers as take more money with them than is necessary for their own wants or less than will suffice to pacify the *auri sacra fames* of highway assailants. On Monday evening a seven o'clock a vetturino carriage was plodding its weary way from Civita Vecchia towards Rome, and had reached a spot four miles on this side of Palo, when its farther progress was opposed by seven bandits armed with bludgeons, pistols, and daggers, who stopped the vehicle and proceeded to rifle the passengers, consisting of Dr. Conolley Roman Catholic bishop of Halifax, on his way to Rome to pay homage to the supreme head of the Church, Mr. Blake, and Mr. and Mrs. Harper. The Bishop was eased of £140, besides his episcopal chain and cross, and pastorial ring, a fine emerald, which he wore according to custom. Mr Blake feeling greatly averse to submitting to spoliation, in his turn manfully resisted the outlaws' invitation to stand and deliver, but he was finally overpowered by numbers, after being severely beaten and having had a pistol presented at his head, which fortunately missed fire. Mr. and Mrs. Harper were robbed of their watches, chains, and purses; and altogether the plunder realized by the marauders may be valued at about a thousand scudi, or over £208.

The Winter.—Mr. M. Ryan, the somewhat noted observer of the weather, makes the following observations relative to the winter:—"The signs for the winter are one third milder than those of last winter. This is a lunar calculation as to the number of days in a moon is to the number of days in a moon-and-a-half; or as 28 is to 42; and within two points of the winter of 1852. God has "tempered the wind to the shorn lamb." There are thousands out of employment —we shall have a mild winter and an early spring. Improve the sleighing when it comes for it will not stay as it did last winter." His prognostications seem to have been pretty well borne out thus far.

Cure for Hydrophobia.—A man was cured of hydrophobia in Italy lately, by swallowing vinegar, in mistake for a medicinal potion. A physician at Padua heard of this, and tried the remedy on a patient; he gave him a pint of vinegar in the morning, another at noon, and a third at sunset, which cured him.—*Scientific American.*

EDITORIAL NOTICES.

Durham Bulls.—Mr. George Miller, of Markham, whose stock is of the first class, has some young thorough bred bulls to dispose of. Mr. Miller's address is Markham Village.

"Transactions."—We send along with this number of the *Agriculturist*, a sheet of the "Transactions of the Board of Agriculture." Subscribers of last year will find this to be a continuation of the "Transactions" already in their hands. They will receive the balance of the volume if supplied to us by the Board. We shall probably be able to supply our new subscribers with the remainder of the sheets, but cannot promise those already issued. In special cases, where it is desired to complete the volume for preservation, we may be able to procure the earlier sheets

Prize Essay on Insects.—We have sent to all our subscribers this year, a copy of Professor Hind's Prize Essay on Insects injurious to wheat, &c., with illustrations. This is the most complete work on the subject that has yet appeared in this or any other country, and should be carefully read and preserved by every tiller of the soil into whose hands it may come. We trust that officers of Agricultural Societies will make an extra effort this year to place the *Agriculturist* and the prize Essay in the hands of the members. They will never have another opportunity of procuring so much valuable information at so small a cost.

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HORSE TAMING SECRETS.

We published, a few months ago, some remarks on the subject of taming horses, with an enumeration of certain drugs or substances of which the horse is very fond, and which have been employed as aids in winning his confidence and rendering him docile. A new method has been discovered, or perhaps, speaking more correctly, an old method has been lately revived, for taming vicious horses, and its efficacy been tested in the presence of Royalty. A Mr. Rarey, of Ohio, accompanied by Mr. Goodenough, of Toronto, is now in England, exhibiting his peculiar skill to the aristocracy and scientific men of that country. He has succeeded in taming some vicious horses belonging to Prince Albert. Her Majesty was present at one or two of his taming operations, and expressed great satisfaction at the result. We believe we are in possession of this secret, or one equally efficacious, and shall publish it for the benefit of our readers. The secret of Mr. Rarey is, it is likely, exceedingly simple, and the same as is commonly practised in some of the adjoining States, where it has become known to so many that it will soon pass, as should be the case with all secrets affecting any important interest of mankind, out of the empiricism and mystery which now envelop it, into the common stock of useful knowledge.

Mr. Rarey has communicated his secret to Lord Alfred Paget and others, under the most stringent obligations that they will not disclose it. Some of the "horse breakers" who have communicated their secrets to us, have imposed upon us no such condition, and it will soon be as public as the "patent method" of breaking steers. The improvement as regards steers consists more in confining them during the operation in a small inclosure usually made of rails, and in the exercise of perfect patience; never striking the animals except when they act on the offensive. "If you strike and keep striking a steer," says an old farmer, "no matter what it does, it is sure to think it may as well do wrong as right." All young creatures should be allowed time for reflection, and it is relatively quite as important to avoid irritation or any-

thing like a sense of injustice in treating the lower animals, especially when they are young, as in our transactions with our own more reasoning species.

Caresses, the use of drugs agreeable te the horse, scratching in parts not easily reached by the animal itself, giving food or water after long abstinence has occasioned hunger or thirst, the careful use of various tones of the human voice—are useful in the tuition of the horse. A liking for the pupil, and tact in training it, which, if they are not natural, it is almost as difficult to acquire perfectly as to become a poet, are essential qualifications in the tamer of all animals, throughout their various grades of intellect. We believe that the peculiarity and secret in the treatment by Mr. Rarey, like that by his "confreres" who profess equal secrecy,consists in raising one of the fore feet of the horse, doubling the knee, and keeping a strap around the fetlock, fastening the foot close to the arm or shoulder. The horse then stands upon three legs. Having next put on a surcingle, pass a long strap or rein through the surcingle, and fastening one end of it around the fetlock of the other fore foot, attach the other to the surcingle after the animal is thrown, so closely as to deprive it of the use of the limb In this item the treatment may be varied by fastening the second fetlock to the arm or shoulder after the animal is down.

When the above course has been adopted, the horse is confined to the ground, and is entirely powerless. He should previously, if practicable, have been halter-broke, and a bridle should be kept on during the operation we have above described. If he has shown much fear of any particular object, a buffalo skin for instance, bring it before him, present it closely to his nose, wrap his head up in it, and by every practicable method teach him—what men and horses are slow to learn—that imaginary dangers cause more fear than realities. This may also be done by opening and shutting an umbrella close to his face, by beating a drum or firing a pistol near his head, or many other experiments.

This plan is successfully pursued by many skillful horse-breakers among the hills and valleys of Western New York, and the horse yields to the necessities of the case ; his spirit of opposition is broken.

We learn that Mr. Rarey, with the shrewd "eye to the main chance" for which his countrymen have sufficient credit, has determined to open a subscription list at two guineas each, for persons desirous of learning the new method of subjugating and educating the horse, and when the subscribers amount to five hundred, classes will be formed to receive the necessary instructions (under certain conditions to be agreed to at the time of subscribing) at the riding school of the Duke of Wellington, who has kindly placed the building at the disposal of Mr. Rarey.

Mr. Rarey is in a fair way to make a fortune.

J. B. Freeman, in the New England *Farmer*, declares that pumpkin seeds have the effect of drying up milk cows ; and that cows fed on pumpkins without the seed increased their milk, whilst the reverse was the fact when seeds were left so that they too were eaten with the pumpkin.

HINTS TO HORSE-KEEPERS.

SIMPLE REMEDIES FOR SIMPLE AILMENTS.

There is a class of ailments, which every horse-keeper ought to be prepared to treat himself without assistance. To call in a veterinary surgeon on every occassion of slight illness, would be both an absurb expense and useless waste of time. For instance, costiveness, common cough, bronchitis, or catarrhal disease, strangles, or colt-distemper, worms, difficulty in staling, and some others, are cases which any man who keeps a horse ought to be able to treat successfully himself without any advice, and with ordinary medicines, easily procurable from any druggist. Condition, in its proper sense, is more dependent on proper and systematic feeding, exercising, clothing and lodging, than on medicine; and if a horse be of good sound constitution, and judiciously fed, regularly worked, warmly yet not too warmly clothed, and stabled in a building properly ventilated and aerated; and, above all, if he be kept scrupulously and religiously clean, there will for him be but little need of medicine of any kind. From ill constructed stables arise half the worst diseases, those for instance of the lungs, from want of ventilation; many of those of the eyes, from the excess of ammoniacal vapors and unnatural darkness; many of those of the feet, as cracked heels, thrashes, grease—which in America is known as scratches—from filth and neglect; and most of those of the bowels, and the bowels and lungs combined from bad food, or good food badly administered. Still, diseases will and do arise from other causes, in the best stables, and among the best-atten'ed horses. And, again, they do arise, and when arising must be dealt with medically, o ving to the causes above enumerated.

It may be well in this place to describe briefly the most approved modes of bleeding and administering medicine. The former operation is performed in the jugular vein, the hair is smoothed along the course of the vein with the moistened finger, then, if the fleam be used —which in our opinion, ought to be exploded—with the third and little fingers of the left hand, which holds the fleam, pressure is made upon the vein sufficient to bring it into full view, the fleam is to be placed on the vein, in the direct line of its course, precisely over the centre of it; not exactly touching it, but as near to it as possible without doing so. A smart blow is then given to the back of the fleam with an instrument called the blood-stick, which gives it force sufficient to pierce the skin and open the vessel. A much neater way, however, is to use a broad bladed lancet. The vein is secured and pressed sufficiently to bring it into full view and cause it to swell, with the divided fingers of the left hand, when the point of the lancet is sent in, without an effort, so as to cut slightly upward and to open a clean and sufficient aperture. By this method the danger of cutting the neck foul, without touching the vein, owing to the horse starting at the moment the blow is given upon the fleam, and the yet worse danger of dividing both sides of the vein, are both avoided. When enough blood has been taken, the edges of the wound should be brought smoothly together, and secured by a sharp pin, around which a little tow or a few hairs of the horse should be twisted. The blood, while it is flowing, should be made by a gentle pressure on the vein below the aperture to spring out in a clear, full jet, and to fall into the centre of the vessel used to receive it. If it be allowed to trickle down by the sides of the pail, it will not undergo the changes by which the extent of inflammation may be judged. The operator should accurately know the size of the vessel he uses, so as to calculate the flow of blood.

In giving medicine, if balls be used they should never weigh above an ounce and a half, or above an inch in diameter, and three in length. The horse should be lashed in the stall, the tongue should be drawn gently out with the left hand on the off side of the mouth and fixed there, not by continuing to pull at it, but by pressing the fingers against the side of the lower jaw. The ball is then taken between the tips of the fingers of the right hand, the arm

being bared and passed rapidly up the mouth, as near the palate as possible, until it reaches the root of the tongue, when it is delivered with a slight jerk, the hand is withdrawn, and the tongue being released the ball is forced down into the œsophagus. Its passage should be watched down the left side of the throat, and if it do not pass immediately, a slight tap under the chin will easily cause the horse to swallow it. The only safe purgative for a horse is Barbadoes aloes, or the flour of the Croton bean, for some peculiar purposes; but its drastic nature renders it undesirable as a general aperient. When aloes are used, care should be taken to have them new, as they speedily lose their power, and they should be freshly mixed. Very mild doses only should be used; four or five drachms are amply sufficient if the horse have been prepared, as he should be, being fed for two days, at least, entirely on mashes, which will cause a small dose to have a beneficial effect, equal to double the quantity administered to a horse not duly prepared for it. The immense doses of eight, nine, ten and even twelve drachms, which were formerly in vogue, and which are still favoured by grooms, ostlers and carters, are utterly exploded; and it was well known that eight or nine good fluid evacuations are all that can be desired, and far safer than twice the number.

Four and a half drachms of aloes with olive or linseed oil and molasses sufficient to form a mass in the proportion of eight of the aloes to one of the oil and three of the molasses, is the best general ball, though often four drachms, given after a sufficiency of mashes or green food will accomplish all that is needed or desirable. Castor oil is a most dangerous and uncertain medicine. Linseed is not much better. Olive oil is safe, but weak. Epsom salts is inefficient, except in enormous doses, and is then dangerous. It is, however, excellent, given in clysters of weak gruel; which, by the way, except where very searching and thorough purging is required, as in cases of mange or grease, is by far the safest, most agreeable and mildest way of purging the horse, and evacuating his bowels. Where, however, his intestines are overloaded with fat, where he shows signs of surfeit, or where it is necessary to prepare him to undergo some great change of system, as from a long run at grass to a hot stable, or *vice versa*, a mild course of two or three doses of physic, with a clear interval of a week between the setting of one dose and the giving of another, is necessary and cannot be properly dispensed with.

Ordinary cases of costiveness can generally be conquered by diet without medicine, such as hop bran mashes, green meat and carrots; but where it is obstinate, the rectum should be cleared of dry fæces by passing the naked arm, well greased up the anus; and the bowels should be then thoroughly evacuated by clysters of thin gruel, with half an ounce of Barbadoes aloes, or half a pound of Epsom salts dissolved in it. If the patent syringe be used, the injection will reach the colon and cæcum and dispose them also to evacuate their contents. Common cough is generally, subdued without much difficulty, though it often becomes of most serious consequence, if neglected. It is accompanied by a heightened pulse; a slight discharge of the nose and eyes, a rough coat and a diminished appetite being its symptoms. The horse should be kept warm, fed on mashes, and should have a dose or two of medicine. If the cough be very obstinate, bleeding may be necessary.

Bronchitis is a cough, with catarrh extending to the entrance of the lungs superadded. It is characterized by a quick hard breathing, and a peculiar wheezing, followed and relieved by coughing up mucus. It must be treated by bleeding, though by no means so copious as in cases of inflammation of the lungs. Repeated bleeding of four or five quarts, at intervals, until relief is obtained, are preferable to the abstraction of large quantities at once. The chest should be blistered, and digitalis, nitre and tartar emetic exhibited, as for inflammation of the lungs; bronchitis, if neglected is apt to degenerate into thick wind.

Strangles or colt distemper, is a disease which shows itself in all young horses, and from which, when they have once passed through its ordeal, they have no more to fear It is

preceded by some derangement of circulation, quickening of the pulse, some fever, cough and sore throat. The parts around the throat swell, the maxillary glands are swollen and tender, and sometimes the parotids also. The animal refuses to drink, and often declines his food. There is a flow of saliva from the mouth and a semi-purulent discharge from the nose. The jaws, throat and glands of the neck should be poulticed with steaming mashes, the skin stimulated by means of a liquid blister, and the head steamed, in order to promote suppuration. As soon as fluctuation can be perceived, the swelling should be lanced, and a rowel introduced, to keep the abcess open and the discharge flowing for a few days. The animal should have walking exercise, and be treated with green food, until the symptoms abate, when he will require liberal and generous food to recruit his strength.

Worms are, sometimes, troublesome to a horse, but in a far less degree than is generally supposed. Botts have long since, been proved to be perfectly harmless while they are within the stomach, all the stories of their eating through its coats being pure *myths*, althougth they are very often troublesome after they have passed out of the esophagus and rectum and begin to adhere to the orifice of the anus. Common purgations will often bring away vast numbers of the long white worm, *teres lumbricus*, which occasionally, when existing in great numbers, consume too large a proportion of the animal's food and produce a tight skin, a tucked-up belly and a rough coat. Calomel should never be given, as it too frequently is for the removal of these worms, which will readily yield to balls of two drachms of tartar emetic, one scruple of ginger, with molasses and linseed oil *quantum suff.*, given alternate mornings half an hour before feeding time. The smaller worm, *ascaris*, which often causes serious irritation about the fundament, is best removed by injecting a quart of linseed oil, or an ounce of aloes, dissolved in warm water, which is a most effectual remedy.

Diseases of the bladder are many, serious, and often mistreated. They require, however, so much skill, and so accurate a diagnosis, that none but a regular practitioner should pretend to treat them. Simple difficulty of staling can generally be relieved by cleansing the sheath with the hand and giving doses of nitre. These are most of the diseases which may be simply and successfully treated at home, and with which every horse-keeper ought to be at least superficially and generally acquainted. We may, possibly, hereafter touch upon the subject of accidents, strains, simple laziness, contusion, and the like, which can often be perfectly cured by cold lotions or simple warm fomentations, without any further or more difficult process, though ignorant persons make much of them, as if their cure proved marvellous skill, and required magnificent appliances.

Agriculture in Britain.—England and Wales, in 1841, were estimated to contain 37,006,400 acres, but had only about 29,000,000 acres under cultivation, and of this, three-fifths in quantity were in meadow, pasture, &c., not under tillage; and it was estimated, at that time, that under proper cultivation, the soil of England could maintain twice its existing population. The average yield of grain in England in 1847, was estimated at 40 bushels to the acre. In 1839, it was only 26 bushels to the acre. This improvement in the husbandry of England has continued, by the extended use of drainage, sub-soiling, irrigation, the application of guano and chemical manures, and the greater use of refuse and sewage, made available in later years, by the cheapness of railway transit. The filth and offal of cities transported to the field of the agriculturalist, become the instruments of increased fertility, while relieving them of the fruitful sources of pestilence and death. In Aberdeen, Scotland, the cleaning of the streets, costs $1,400 per annum and the refuse sells at $2,000, yielding a profit of $3,000 a year, and similar results are given in other European cities.

Curious Cattle.—A Cincinnati paper thus speaks of a lot of cattle recently exhibited in the Fifth-st. Market, and which attracted a large crowd:—"They consisted of a cow of the Chinese species, five years old, which measured only thirty-six inches in height; a calf by her side, four months old, 26 inches high; and a bull, of the same species, measuring 48 inches. There were also three calves all of the same lilliputian dimensions. The cow generally gives from 10 to 15 quarts of milk per day. Full grown cattle of this species weigh about 400 lbs. The group in the market were great curiosities in a small way."

POTATOES—MOST VALUABLE IN NEW YORK MARKET.

We condense from an interesting article in the New York Weekly *Tribune*, the following remarks on the potatoe. The varieties most largely cultivated in the State of New York, by market gardeners, are named and described. As the season for planting early varieties is near at hand, and as so many of the common varieties have failed to reward the cultivator, we advise our readers to supply themselves with the most promising of the new varieties within their reach. We shall be able to spare a few bushels of the new varieties which we have grown for three seasons. Last year they yielded well, and were free from rot, while all the common varieties in the same field were badly affected. Their qualities as table potatoes are not yet fully known, as new varieties generally improve in that respect by cultivation. They are white-fleshed, prolific, good-shape, fair size, hardy, and so far, free from rot. New varieties possessing these qualities should not be rejected, if not so agreeable in flavour as pink-eyes and cups, for a few seasons.

ORIGIN OF THE POTATO.

Historically, we are told that this most important of all vegetables originated in South America, where it grows wild, and where it was first discovered by Europeans, probably within the limits of the torrid zone.

It was introduced into Europe by Sir Walter Raleigh about the year 1586, and its culture was confined to the gardens of the nobility of England during the succeeding century, In 1613, the price of potatoes is stated, in the household expenses of Queen Anne, at 1s. per pound.

Sir Walter Raleigh introduced potatoes into Ireland in 1610. Their culture, as a field crop, commenced in Scotland in 1728.

English writers estimate that twice as much food is produced from an acre of potatoes as from an acre of wheat. Its character is anomalous.

No theory of climate, soil or culture can as yet explain the phenomena of its growth, or the nature and cause of the disease, which of late years has reduced it from the most certain to the most uncertain of crops.

Though a native of the torrid zone, it grows most luxuriantly in the Northern States and British Provinces of this continent, while in Ireland its culture attained the highest relative importance. In Sweden it is cultivated as far north as the sixty-fourth degree.

VARIETIES.

The varieties are innumerable and ever-changing. Whether different sorts may be crossed or mixed by contiguous planting or not, is an open question.

New varieties are constantly obtained from the seed-balls of the vine, which usually have little resemblance to the parent root, and mature or attain full size about the third year. Very few varieties ever attain a standard character, and enterprising cultivators are constantly on the alert for something new.

Every section and almost every neighbourhood must rely upon its own experience; nothing can be taken on trust or from distant repute.

Some varieties are improved in quality and yield by change of climate or locality; others degenerate from the same cause. Some sorts become acclimated at once, and attain a standard character in new locations; others flourish well at first, but require a yearly renewal of seed from the parent soil; and a knowledge of these peculiar characteristics is attained only by experiment.

We have noticed some facts, which we offer for the benefit of cultivators. As a general rule, yellow potatoes are rank and strong—white ones, good-flavoured.

The *Mercer* has been for many years the standard variety, having continued to succeed longer and attained a wider culture than any other. It is said to have originated in Pennsylvania

about 25 years ago. When first introduced, this variety was objected to on account of the blue streaks pervading the otherwise white meat, but the excellent quality and reliable yield has kept the Mercers in general use. This and other parti-coloured varieties are very much whiter when raised in this latitude than at the North, and if northern seed of these sorts be carried South, the product will be much whiter and handsomer than the original seed, taking precedence in market over the same varieties of northern growth. The Mercer seems to be now on the decline in many sections, and likely to be succeeded by new varieties of northern growth.

The *Carter* is one of the finest table potatoes ever grown. It is white throughout, slightly oblong, with deep under-set eyes, and when boiled has a dry, light, flour-like appearance, with great delicacy of flavor. It originated some 20 years ago with a Mr. Carter, near Pittsfield Mass., and was soon cultivated largely by the Shakers. From them their culture spread northward, and is now mostly confined to Washington County, New York.

The Carter ripens late, and has failed of success in this latitude—is very liable to rot, and is now running out where it has succeeded best.

The *White Pinkeyes*, or *Pinkeye Kidneys*, are an old variety of excellent quality, rambling growers, generally yielding fairly upon rich and well-adapted ground.

Junes, Yellow Pinkeyes, Northern Whites and *Rock Whites* are all of the same family, or nearly related. They are yellow-meated, watery, and sometimes rank-flavored. They mature early, particularly the Junes, on which account they are a good deal cultivated, and generally escape the rot and yield fairly.

California Potatoes are oblong-shaped, yellow-meated, parti-colored skin, great size, immense yielders, strong, watery, unfit for the table (of Christians), but are fit successors to the old and discarded Merino Potatoes, once so popular throughout New England, and still cultivated in some places for stock.

The *Dikeman* is a native of Oneida County, N. Y., where it was started from the seed about fifteen years ago by a well-known farmer whose name it bears. The tubers are round, white, with pink eyes; it ripens earlier than the Mercer, and generally escapes the rot; is a good yielder, and is extensively cultivated as an early potato for this market. It degenerates rapidly, however, in this vicinity, so that a yearly removal of seed from its native locality is necessary.

Western Reds are one of the best of the yellow-meated varieties, and when raised on Long Island, or in New Jersey, are very fair table potatoes. They are in large demand for shipping, and are every Fall exported to Bermuda for seed, their product—the highly prized *Bermuda potato*—being returned to us in the Spring. It is remarkable that all other varieties tried in the Bermudas have failed.

NEW VARIETIES.

We note a few prominent new varieties, as follows :—

The *Black Mirror* was introduced into New Jersey some four years ago from Western New York. It is shaped much like the Mercer; the flesh is entirely white, the skin very dark and thick. It is very late, requiring the whole season to mature; yields largely, producing twice as much as the Mercers. If peeled before cooking the quality is good, particularly in the Spring, though not so dry and light as the Mercer. The dark skin is prejudicial to the sale, and it has rotted badly the last two years, so that many are now abandoning its cultivation.

The *Buckeyes* have been grown one year, in Monmouth County, N. J., and with remarkable success. They are handsome, round potatoes, white throughout, except a little bright pink at the bottom of the eye, and cook dry, mealy, and are fine-flavoured. They were introduced from Ohio to the vicinity of Rochester three years ago, and grown there by D. S. Whitlock, Esq., from whom J. S. Whitlock of Monmouth County, N. J., obtained seed for himself and neighbours. J. S. W. planted three acres of sward ground, which averaged 250 bushels per acre; on corn-stubble he had an average of 165 bushels per acre. His brother, G. S. Whitlock—same neighbourhood—planted three acres corn-stubble which averaged 200 bushels per acre—in both instances giving a yield more than double that of Mercers in the same fields. They were free from rot, while all other varieties in the same neighbourhood rotted badly. They were first sent to this market by J. S. W., and, from their large size, handsome appearance and fine quality, sold readily at the highest rates—constant inquiry continuing for them after the supply was exhausted. They are one of the most promising new varieties.

The *Prince Albert* is a seedling imported from England, and introduced into Massachusetts a few years ago by an Englishman, whose name we are unable to learn. They were introduced to this market for seed by Messrs. Steers & Edwards, some four years since, at very high prices. The demand for them for seed has kept pace with the supply, and we learn that S. & E. have just sold fifty barrels to one of our seedsmen at $5 per barrel.

They are an oblong shape, a little flattened, entirely white, very few eyes, which lie upon the surface, scarcely indenting the thin, smooth skin, being one of the most beautiful potatoes ever grown. They are an early variety, ripening with the Mercer, and grow to a handsome size, sometimes very large, and yield largely and have never rotted. C. G. French of Monmouth County, N. J., raised about two acres the last season, surrounded by three other varieties, all of which rotted badly, while the Prince Alberts entirely escaped. They have not yet come in the market for general consumption, but are highly praised by many that have tried them as a table potato.

The *Peach Blows* and *Shepard Reds* are seedlings from the Western Reds, started by Mr. Shepard of Saratoga county, N. Y. They are round, with whitish-yellow meat, and deep eyes. The former have a parti-coloured skin ; the latter a rough red skin with pink streaks in the outer portions of the flesh. The Peach Blows are a very fine table potato, cooking dry and light. They have been grown to some extent in Monmouth County, N. J., with promising success, though they did not the past season attain the size of those raised at the north. The quality, however, was decidedly improved by change of climate and soil, being smoother, whiter, cooking dryer and lighter, and selling 50 cents per barrel higher than those of Northern growth. The Shepard Reds have a less attractive appearance and have not been tested in this market. Both varieties ripen late, and like all late potatoes are more liable to rot than the early sorts.

Dovers are a small, round, red potato, deep eyes, white flesh, and from their superior quality, sell to a limited extent at good prices. They are not economical for the table, and we presume their yield is light. They grow principally in Rhode Island.

As we have aimed to embody facts of practical value, we have abstained from remarks upon other varieties that have not attained character in this market sufficient to warrant extensive cultivation or authorize us to give them a recommendation.

James F. C. Hyde of Newton Center, Mass., speaks highly of some new varieties that he grows, as follows :—

" *Davis Seedling Potato.*—This is one of the very best potatoes grown, taking everything into consideration—size, productiveness, hardiness, &c. I do not mean to say it is of the best quality for eating when compared with the State of Maine or Carter ; but I do mean that it is a good eating potato, which, added to all its other good qualities, makes it a very desirable variety. Its colour is red outside and white inside, slightly tinged with pink just under the skin ; large size, and very free from rot. This variety originated in Sterling, Mass., and has been under cultivation some eight or ten years. It is so far superior to Peach Blows, Vermont Whites, Pinkeyes, and those common sorts that are raised in the country, that I should advise all who grow potatoes for market in Fall or Winter, to raise this sort for one. It requires a full season to mature. It yielded better than any other out of the forty kinds I raised last year.

" *State of Maine.*—This is a fine eating potato, unsurpassed by any in the whole list, not excepting the Riley or Carter. It is not more than half as productive as the Davis, but superior in quality for the table. It is white outside and inside, and shaped somewhat like the White Chenango. This variety is quite early, being not more than a week later than the Chenango, to which it is superior. Should not consider it so profitable a variety for the market, except for early, as the above-named variety.

" *Jackson White.*—A sort of recent introduction, and promises well. I have grown it two years with fair success, but have never had it dry and mealy as the State of Maine. This is a white potato, nearly round, medium size, eyes deeply sunk, fair as to productiveness and hardiness, worthy of trial.

" *St. Helena.*—This is an old and well-known sort that was formerly cultivated in this region, but for some years has been neglected, but now comes out under other names, Such as Laplander, White Mountain, Seedling, &c. It is a very productive sort, very handsome on account of its good size and whiteness. Quite free from the rot. This pototo is apt to be foggy, and for that reason is not so highly esteemed."

Out of all the sorts described, it certainly does appear to us that farmers generally can select some new varieties that will prove more advantageous to them than to continue to grow such kinds as they have always cultivated, and perhaps, their fathers before them.

PROPORTIONAL AVERAGE OF CROPS IN SCOTLAND.

It may gratify a reasonable curios ty in some of our readers, to be informed in regard to the proportion which the various field crops raised in Scotland bear to one another, or, in other words, what proportion of every 100 acres in tillage is occupied by each of the crops commonly cultivated. This information may not, indeed, be of any direct *utility*, but cannot fail, we think, to be highly *interesting*, especially to those who have the means of comparing the facts with similar statistics in their county or State. The information of this description which follows, is derived f.om the tables (f Scottish Agricultural S:atistics, which have been recently published. The proportion varies in different counties, but taking the whole country together, the proportion of the different crops in every 100 acres is as follows :—

	1857.	1856.	1	1854.
Wheat	6.274	7.428	5.419	4.765
Barley	5 578	4.675	5.271	5.879
Oats	26.391	25.912	26 449	26.430
Rye and Bere	.776	.564	.594	.621
Flax	.043	.077	.098	.189
Vetches, Turnip Seed, &c.,	.607	.586	.517	.421
Beans and Peas	1.206	1.277	1.212	1.243
Turnips	13,403	12.979	12.731	12.292
Pot.toes	3.931	4.213	4.163	4.052
Mangold	.079	.100	.064	.055
Carrots, Cabbage and Rape	.144	.125	.068	.074
Summer Fallow	.523	.436	.637	.740
Grass and Hay under rotation	41.045	41.628	42.777	42.239
	100.	100.	100.	100.

It will be seen at a glance at the above table, that oats are cultivated to a much greater extent than any other grain ; and that the large proportion of the soil devoted to grass and turnips, besides the permanent pastures which are not included in the above, indicates very manifestly that the feeding of stock for dairy and other purposes, must be one of the principal branches of agricultural industry in that country.

The following additional items in regard to the crops of Scotland during the past year, may be interesting to several readers :—

Of wheat, the whole amount raised was 6,154,986 bushels ; and the average produce about 28 bushels per acre.

Of barley, the whole amount raised was 6,494,534 bushels, and the average produce about 32 bushels per acre.

Of oats, the whole amount raised was 32,750,763 bushels, and the average produce about 33 bushels per acre.

Of beans and peas, the whole amount raised was 1,037,760 bushels; and the average produce about 22 bushels per acre.

Of turnips, the whole amount raised was 6,690,109 tons; and the average produce about 14 tons per acre.

Of potatoes, the whole amount raised was 430,468 tons ; and the average produce about 2¾ tons,—ranging, however, in different counties, from 1 ton 8 cwt. to 5 tons 11½ cwt. per acre.

These averages, it will be observed, a e considerably higher than any averages which have as yet been reached, according to census repo ts, in this country. The larger crops of wheat, &c., of which Scotland may boast over this country, are unquestionably owing principally to a higher and more careful cultivation. An advance in our mode of cultivation, would give us also an advance or increase in our crops. Probably neither country has yet come very near to the end of all perfection.

Sulphur fed to sheep is pronounced a certain remedy against the ticks which frequently infest very injuriously, these animals.

FARM ACCOUNTS AND STATISTICS.

We can only *generalize* from *particulars*, and upon the truth of the items, statistical and descriptive, depends the value of all deductions and inferences. This is particularly applicable to agricultural generalizations. They are too often made up from guesses—from random estimates—and mislead those who rely upon them for practical information.

What a mass of valuable particulars might be readily obtained, did farmers generally keep an account with their crops—of cost and product—of soil, culture, and circumstance. Few, very few, know how much (with any exactness) a crop of wheat or corn has cost them, or the expense attached to rearing animals for use and sale. A large class cannot even tell what their cash receipts and expenses are for a year, save as they remember the different items; yet they carry on a large business.

In that business, how can they proceed understandingly? How can they tell what branch of farming is most profitable? How do they know but they are losing money by that to which they give the greatest prominence, and making good profits upon that which they consider of very little importance? A correct account of capital, expenses, and receipts with each branch of farm products, would settle all these questions.

Any farmer who wishes to determine his stand-point for the future, should now commence with an inventory of lands, stock, grain, implements, &c. With the opening of our spring work, a journal of its labours should be kept, and these, posted weekly to the different classes of crops, &c., to which they belong, will show him at the end of the year what each crop has cost. A little care in measuring, weighing, &c., will show its approximate value, and then he has in black and white the result of his season's work. There he would find the material for many hours of thoughtful cogitation while maturing plans for the future, and thence he could draw stores of facts and particulars, useful to his brother farmers, to be disseminated by the public press.

Another thought. Who would think of carrying on any sort of a manufactory without a book-keeper and carefully kept accounts? No one, surely. But the farm is as much a manufactory as any which can be named, and its operations cannot be conducted skilfully and intelligently unless the same system is pursued.

TRIAL OF REAPERS AND MOWERS AT SYRACUSE.

The following remarks by the Committee appointed to test the mowing machines entered for that purpose at Syracuse last summer, will be read with interest by all manufacturers of these implements in Canada. They will also serve to direct the attention of purchasers to those points of the mowing machine which require to be thoroughly made and well adjusted to render it durable and capable of giving satisfaction :—

1. We believe there has never before been any systematic attempt to analyze the total amount of power consumed, and to distribute it among the various parts. We think this has been as satisfactorily established as could be expected on a first attempt. Table D. (of draft) shows that the average of all the machines for total power is 418.6 lbs.; while Burrall's (the minimum) is 352.9 lbs.; and Caryl' (the maximum) is 483.1 lbs. This very wide difference is calculated to awaken the attention of the mechanics to the variations of detail on which this difference depends—many of which are disclosed in tables F. and G. The power expended solely in cutting, differs from the general average, and among different machines far more widely than the apparent simplicity in the cutting apparatus would lead a casual observer to suspect. The general average of power thus expended is 131.7 lbs.; the maximum is F. J. Frelinghausen's, 181.6 lbs.; the minimum is Walter A. Wood's 66.8 lbs. The power expended in giving vibration to the knife averages 60 lbs.; the minimum being 26 lbs. in Burrall's, and the maximum 90 lbs. in Pruyn. These facts offer interesting problems for the study of mechanics, and we cannot doubt that their solution will lead to vast improvements in the construction of these machines.

2. Sufficient attention has not been paid to lightness, in the construction of these machines. This point has probably been overlooked because dynamometer trials almost invariably take

place on level ground, where the waste of force is masked. We would invite the attention of mechanics to the remarks already made on this topic, believing that attention to them on their part, will lead to great economy of power.

3. We believe this trial has shown that grass is cut more easily when the angle of the apex of the knife is obtuse, or the angle between the cutting-edge and the base of the knife is acute – since it then approximates more nearly to a saw cut, and less to a chisel cut. If we are correct in this, very many of the machines may be improved, as may be seen from table F.

4. It seems clearly settled by this trial, that a broad, wedge-formed guard is superior to a straight one, for the reasons assigned on page 52. It is obvious that when the grass is drawn over at an angle of forty-five degrees, as it is in some machines, the area of the cut section is much greater than when cut standing perpendicularly,and must therefore absorb more power. The cut in the latter case is much more analogous to the saw, and it affords a much better protection against stones. We think it a great error in Pruyn & Lansing's machine, that the lower part of the guard is smaller, (narrower) than the upper part. The effect of this arrangement is, that the force of the cut is expended on the root of the grass, which tends to draw it out and break the fibres, which will either kill it, or retard its starting in the fall. This effect is less apparent when the knife is sharp, but will become very serious when it is dull. The *tendency*,however, exists at all times.

5. It has long been understood by mechanics, that internal is better than external gearing, where it can be applied, because the larger wheel more nearly coincides with the smaller in form, and therefore brings a greater number of cogs in contact. We were therefore surprised to see so many machines geared externally, and would recommend a change in this respect.

6. Nothing has been more clearly demonstrated, in our judgment, than the value of balance-wheels in promoting the smoothness of working of the machines, where they were properly adjusted and judiciously located. Some were too small to act well at the velocity with which they worked; in others the weight was not sufficiently distributed to the rim, and in others the counterpoise was so placed as to increase, rather than overcome the momentum of the knife. We recommend to all builders of these machines, a careful series of experiments, with a view to ascertain the exact size of balance wheel which will best overcome the momentum of the knife at their respective velocities. We also advise that the wheel shall be located near to the pitman, as a remote location gives rise to a twisting and irregular action on the journals.

7. Most inventors seem aware of the value of a light knife in diminishing the momentum, although we think there is much room, by the use of an improved quality of materials, to reduce its weight still farther; but some seem to forget that the weight of the connecting-rod, as well as the weight of the knife, is an element of momentum. Some of these were very unnecessarily long and heavy. A reduction of these dimensions will therefore be followed by a material reduction of power expended.

8. It is often overlooked, that time, as well as force, is an element in the consideration of power. A variation of ten pounds in the draft of two machines is looked upon by many as a mere bagatelle. It is not considered that this force is extended throughout every second of time of working. If, then, the two machines work for ten hours, the difference of force is not represented by 10 lbs., but by that number multiplied into the number of seconds in 10 hours, viz: 10 h. $\bowtie$ 60 m. $\bowtie$ 60 sec. $\bowtie$ 10 lbs.=360,000 lbs. Our excuse for an allusion to a principle so entirely elementary,must be found in the fact that it is so strangely overlooked by many farmers and mechanics; and we hope that the remark may stimulate inventors to attempt every possible reduction of force, even if it be apparently very small—being assured that in the long run, it will be very considerable.

9. It seems fully settled, that the most desirable position of the knife is in a line with the centre of the driving-wheel, as in Ketchum's machine.

10. It is also very clear, from this trial, that the cutter-bar should be flexible, as connected with the frame of the machine. The grass is cut more evenly, and side draft is prevented; for when the knife on a stiff machine, rises over a knoll, or other obstruction, the pressure on the surface of the ground increases the resistance and causes side draft. For this reason, those machines which have flexible fastenings of the cutter-bar to the frame, have the least side draft, provided the draft is properly attached. Hence, such machines as Ball & Aultman's, Kirby's, and the last made mower of Ketchum's, &c., are to be preferred in this respect.

11. Much difference of opinion exists among the builders, with regard to the comparative merits of cast or wrought iron fingers or guards. We do not suppose that our judgment will settle conflicting opinions on this point; yet we deem it proper to say, that be believe the cast iron finger to be be the best, on the whole. We think that it is better that a guard should break, than bend. In the latter case, the friction will be very greatly increased, consuming an increase of power, which is expended in wearing out and deranging other parts of the machinery. Many country blacksmiths are not qualified for such a job, and make it worse by their attempts to repair it; while any farmer can take off a broken guard and replace it by a new one in a few minutes. It is probable, however, that considerable improvement may be made by a proper mixture of metals in casting them. The guards in Allen's machine seem of a very excellent quality,and we are informed that they were produced in this way. We think, too, that Allen's concave knife is a step in the right direction for reducing friction, and for diminishing the weight of the knife without lessening its strength.

12. We noticed with pleasure, on some machines, contrivances for increasing the comfort and security of the driver. Ball, Aultman & Co., R. L. Allen, Seymour & Morgan, and some others, have comfortable springs to the seats, which make the work of the driver much less laborious. We think when the cutter-bar is not in a line with the shaft of the driving-wheel, it should be in *advance* of it. There have been many instances, where the driver has been shockingly mangled by the knife, being thrown from his seat. This would not have occurred if the knife had been before the driver's seat.

13. We would invite the especial attention of builders to the wedge-form cavity in the guard under the knife, as described on page 43 in connection with Halenbeck's mower.

14. We speak of the cam principle with diffidence. The simplicity of structure which it admits is a strong temptation to use it; yet it will be seen from Table D. that the ease of draft which ought to follow simplicity of structure, has not been attained in practice. Pruyn & Lansing required 446 lbs.; F. J. Frelinghausen's, 492 lbs.; and Caryl's 493 lbs. Or, according to the more accurate statement on Table E, Pruyn & Lansing required 8.494 lbs.; Frelinghausen, 8.946 lbs.; and Caryl, 8.502 lbs., per inch of cut to drive them.

Notwithstanding this result, we are not quite incredulous with respect to the application of the cam principle to the propulsion of mowers and reapers, and we would invite the attention of inventors to the utilities which may lie latent in the cam. There was much in the mechanical arrangement of all these machines which may account for their tendency to expend their power in hammering themselves to pieces, without charging it to the fundamental principle of the cam. Accuracy of adjustment, the avoidance of loose play between the respective parts, and smoothness of surface where the parts rub or roll on each other, are indispensable to perfect cam action; yet, all these points were neglected in all three of them.

Pruyn & Lansing's machine complied more nearly with these conditions than the other two, and the result is seen in its reduced draft. We think if this machine were altered from a straight to a curved zig-zag*—if there were increased precautions against the intrusion of dust and dirt—if larger friction wheels, made of composition metal, were employed, and more accurately adjusted to roll on the face of the cam, without any play—if the length of vibration of the knife could be shortened without injury to the cutting power—and if the momentum of the knife could be arrested just before changing its direction, by an elastic spring placed at either end of the machine, we might hope for a decided improvement over everything now in existence.

15. A difference of opinion also exists with respect to the advantages of wooden and iron finger-bars. In our opinion, iron-finger bars, (which can be made much narrower than wooden ones,) are better adapted to the cutting of *fine, short* grass than wooden ones, on which, from their greater breadth, the grass piles up and tends to clog the knife; but in ordinary grass, we prefer the wooden finger-bar, as in case of accident farmers would be able to repair or renew it without recourse to the mechanic's shop.

16. When grass is long, and the wind is blowing in the same direction that the machine travels, it is very difficult, if not (in some cases) impossible, to cut without a reel. In other cases, it is much better to cut without one, as the grass after cutting, is in a much better condition for drying. We therefore consider it desirable that mowers should be furnished with reels which can be quickly and easily removed and replaced. They would then be enabled to cut under all circumstances.

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* I have not had time to investigate the ordinates of the proper curve, but presume, from analogy, that it would be a cycloid.

17. Most machines are now made portable by a small removable wheel, which may be attached to the outer end of the cutter-bar at pleasure. We very much prefer those, which like Wood's, Ball's, Aultman & Co.'s, Pell's, Manny's, &c., are *permanently* portable. In lodged clover, or grass of any kind, it is often desirable (in farmers' phrase) to fetch the swaths. In such cases it is very inconvenient, and with spirited horses, dangerous for the driver to get off and upon the end wheel.

18. The driving-wheel should in all cases be covered, as in Allen's machine, and should be furnished with a convenient box to hold the necessary wrenches and other tools, with a compartment for an oil can, where it can be carried without risk of spilling.

19. The oil holes should be covered with tin covers, and supplied gradually to the journals by candle wicks, or some similar contrivance.

20. A knife is much wanted which shall be easily detached from the bar, for grinding, &c., and which is not liable to become loose from the rapid motion of the bar. If Mr. Hovey's contrivance does not answer the purpose, we think the attention of inventors should be directed to the making of one.

IRON HURDLES IN CANADA.

The following communication was read at a Meeting of the Board of Agriculture in Toronto. Its importance will justify its publication in the *Agriculturist* :—

AILEY LODGE, March 20th, 1858.

MY DEAR SIR,—Mr. Buckland spoke to me, a few days ago, upon the subject of iron hurdles, asking my opinion of their adaptation for farm fences in this Province, and their probable cost. I told him that as to my own experience I found them answer every purpose as a fence, and all that I could desire. Where cattle have been bred and raised upon the farm, and not accustomed to roam at large in the bush, I consider them to answer every purpose as a fence, as in no instance have any of my cattle attempted to break over them. But for cattle that have been permitted to contract bad habits by roaming at large in the bush, I am not prepared to say they are a sufficient guard against trespass. But, indeed, in such cases, I know of no kind of fence that is proof against such depredators. The few hurdles (100) which I imported for my own private use in 1854, were six feet in length, three feet six inches in height from the flange that rests on the ground, and weighing 53 lbs. ; cost, 5s. 3d. sterling each at the manufactory. These fasten together with a bolt passing through a socket three inches long, secured with a nut. This mode of connecting was a suggestion of my own, and makes a very firm, resisting line of fence, but it is attended with more trouble, and takes up more time in planting and removal than the hurdles connected in the ordinary mode, and adds 3d. sterling to the cost of every hurdle, and, without care in the removal, the bolts and screws are apt to get lost. The extra cost of 3d., however, I consider compensated for by the three inches gained between each hurdle, being equal to three hurdles in the 100. Hurdles of the same weight and dimensions, connecting in the ordinary way—viz., with a link twisted in the form of a figure 8, secured to one hurdle, and passing over the head of the upright bar of the other at pleasure, can be purchased at the rate of 5s. each. Hurdles upon this construction are more conveniently handled, and

free from the danger of losing the connecting link. But still I prefer the bolt and socket, it makes a much firmer fence, and the extra cost is regained by the additional space of ground covered, and a few dozen extra bolts and sockets, at 3s. per dozen, can be added to supply the place of loss. The prices I have named would, of course, be subject to the fluctuating price of iron, and would either be reduced below, or increased above the prices quoted, in accordance with the price of iron at the time. But even under any change, either up or down, I do not think the price of hurdles would be affected above 3d. each, above or below the cost I have named. I am firmly of opinion, too, that if the Provincial Government would admit the importation of wrought iron hurdles at the moderate duty of 2½ per cent on the invoice price, that hurdles of the very best description and quality of iron of 6½ feet in length (with two uprights) three feet six in height, and weighing 56 lbs each, could be laid down in Toronto at from 7s. 6d. to 8s. 9d. currency, each. The revenue, instead of losing, would be benefitted by the operation, to the extent of 2½ per cent, as any higher rate of duty would act as a prohibition to their importation. This permission on the part of the Government would in no way affect, or encroach upon, the interest of the mechanic, as none whom I have spoken to upon the subject, would undertake to make the same kind of hurdle for less than 20s. to 25s. each, and then of inferior iron. For the reasons assigned, I am fully persuaded that if the Agricultural Board would communicate with the "Governor General in Council," setting forth these facts, and the urgent necessity that exists for the introduction of a better, more endurable, and economical kind of fence into the Province than any at present in use, and so obviously to the advantage of the Province, the boon denied to an individual would be willingly conceded to the Agricultural Society.

The larger the quantity of hurdles ordered, the greater would be the advantage in purchasing, and economy of freight upon the simple principles of commerce. 1000 can be bought and shipped upon better terms than a tithe of that number; on that account it would be advisable to ascertain what number of gentlemen in the country would join in the importation, and what number of hurdles each would take. For one, I would take 100, on my own account at least, and doubtless many others would take a like number, so that a respectable Invoice would be ensured to begin with.

The 100 hurdles which I imported in 1854, were under every disadvantage, but that of purchase, which was at the lowest cash price of the time. The hurdles were manufactured in the interior of the country and subject to 50 miles inland carriage to port of shipment,—the freight across the ocean was paid by measurement instead of by weight, and the duty exacted 12½ per cent. Yet in defiance of all these untoward circumstances, including inland carriage from Montreal, and Insurance, I consider that my hurdles do not stand me in more than 12s. 6d cy. each. At that period, there were no vessels sailing direct to Liverpool from the Upper Lakes, and returning with freight cargoes, as now obtains, affording a better chance of procuring freight upon more reasonable terms, and of delivering the goods in Toronto without trans-

shipment, and consequently in better order. It is well that I should state also, that I have tried the use of wooden hurdles, which I contracted for at 5s. 6d cy. each. I found them bulky and inconvenient to handle, and to store away when not in use,—very perishable and continually out of order. Out of 150 made some eight years ago, not more than 50 now remain, and those in a dilapidated condition. Whereas the Iron hurdles, with proper care and an occasional coat of paint applied, are all but indestructible, and will endure for years.

I have thus been minute and particular in what I have advanced, in order that no one might be led astray ; my observations are intended for the general good, and not for the private advantage of any one, as in that case I would be no party concerned. Should the Board deem what I have submitted to be worthy of consideration, and have any wish to question me on the subject either verbally or in writing, I will, most willingly attend to their wishes, and give what additional information I may have it in my power to convey. I remain, my dear Sir, very truly yours,

JOSEPH BECKETT.

To W. McDougall, Esq., Yonge Street.

ENGLISH AGRICULTURAL IMPROVEMENTS.

Several improved machines and processes have recently been produced in England. One, by Alfred Newton, relates to the cultivation of land by spades, operated by locomotive power as the machine progresses in the field. It breaks up, disintegrates and turns over the sward more thoroughly than can be done by the plough. A series of spades is made to enter the land in succession, and cut it into the arc of a circle, when the cut slices are suddenly thrown up against a shield plate, at once reversing and breaking them almost into powder. This machine is only a new form of steam plough, at which English mechanics are still trying with unabated activity. Mr. John Fowler has also invented an improvement in the mode of operating the ordinary steam plough, which greatly simplifies its movements, and enables it to travel through the furrow with more certainty and freedom. Mr. William Dray of London has patented an improvement in ploughs, which applies to such ploughs as are provided with a share in the form of a pointed bar, and consists in the means of securing the bar in its position after being pushed forward, as may be from time to time required by the wearing away of the point thereof. The patentee claims the construction of ploughs which are provided with moveable share bars, in such manner that the bars can be tightened or slackened by means of an eccentric roller or collar. Mr. Robt. Reeves, of Wiltshire, has patented a cart body for the purpose of delivering manure over a field without requiring it to be thrown out by hand. The bottom of the cart body is supplied with longitudinal openings, in which revolve drags or blades attached to an axis under the body. As the cart moves, these drags pull down the manure in a condition of complete pulverization.

A NEW MANURE.

In a report of experiments with different manures, contained in a recent issue of the *North British Agriculturist*, we observe that one of the manures used was saw-dust steeped in chamberlye for six weeks. This, like the other manures reported, was employed as an application to a crop of turnips. Nothing is said about the manner in which it was dried and made fit for sowing, whether by exposure to air and sun, which, we think, would rob it of some of its most valuable properties, or by mixing it with some dry and pulverulent substance. Should any of our readers try this new manure, it would be well to employ some absorbent of ammonia, as charcoal dust or seasoned muck, in the reduction of it to a dry state. Neither is the quantity which was used mentioned, all that is said under this head being that it was "sown with a good handful along the drill." The effect of this manure upon the turnip crop is about equal to that of four and a half cwts. of Peruvian guano, costing about $16; the produce of the plot manured with the soaked saw-dust, being at the rate of 17 tons, 8 cwts. of turnips per acre, (white globe,) and that of the plot manured with Peruvian guano being at the rate of 17 tons and 18 cwts. per acre.

We presume that this new manure will be tried by many both in Great Britain and this country during the coming season. The individual who reports upon it, says that the saw-dust steeping was an idea of his own, and that it will be tried next year on a more extensive scale by several farmers.—*Country Gentleman.*

COST OF GROWING A BUSHEL OF WHEAT.

A correspondent in Bucks county, Pa., says—I have been making a calculation of what it costs me to raise a bushel of wheat. The result I enclose you, and would like to know whether it costs others as much as it does me.

Plowing, say ½ day,	$1.25
Harrowing three times and rolling,	1.25
One-half cost of 25 loads manure,	12.50
Hauling and spreading,	3.00
Plowing and harrowing, ½ day,	1.25
Harrowing, rolling and drilling,	1.25
1¾ bush, seed, cost in 1857, $1 75	3.06
Rolling,	25
Interest on $1000, 6 per cent,	6.00
	$29.81

Yield 25 bushels, or about $1.19 per bushel. Weight of wheat Sept., 1857, 63¾ lbs. per bushel.

The estimate I think is rather under than over the mark. The interest or rent of the land I have charged at six dollars per acre, but land that will produce 25 bushels of wheat per acre, is held in my neighbourhood at from $125 to $150, which would make the interest $7 50 to $9. I have often noticed that when a farmer's attention is called to the price of an agricultural product, his reply is—"Oh! you must not charge the cost of your own labour, at the same price you would have to pay if you hired your work done—farming would never seem to pay if you did that." That is, you must allow less for your own labour, than you pay your hired men. Is this a correct way of showing farming to be profitable!—*Country Gentleman.*

VARIETY OF FARM PRODUCTS.—A celebrated French agriculturist, Gasparin, speaking of the advantages of cultivating a variety of farm products, eloquently says:—"We write upon our flag, *Variety!* That's my device. That rapid locomotion which explores the world, which interrogates all climates—that spirit of investigation which is the characteristic of our age all will concur in concentrating upon our soil the young productions snatched from rich countries, and which we shall find means to naturalize. The most humble table shall be covered with new gifts: like that of the rich, it shall enjoy a diversity of food, which is the pledge of health, strength and contentment. Uniformity, whatever may be the scale that we assign to it, is the worst of conditions: It is the spleen of the North; it is the misery of Ireland; it is the rule and the chastisement of convents, the home-sickness of the barracks."

HUNGARIAN GRASS

(*From the Rural New Yorker.*)

Eds. Rural :—You will excuse me for troubling you with a few paragraphs on a topic that I conceive to be of real importance to agriculturists and all directly or indirectly concerned in their prosperity, which would include, I apprehend, that vast concourse, " all the world, and the *rest* of mankind."

The subject of which I design writing is a peculiar kind of grass introduced into this neighbourhood some four years since. This product, from its being brought here by that band of Hungarian exiles, who, under Ujhazy, settled in Decatur Co., is called Hungarian grass. This much of its " pedigree" will suffice. I will, in a very few words, state its commendable qualities, now well established, after a fair and thorough trial.

1st. This grass will yield from three to seven tuns per acre, according to soil and season. A fair average crop on ordinary soil and fair season is four tuns per acre.

2d. Its nutritious qualities are not excelled by any product now in use as provender for any kind of stock. Cattle, horses, hogs, and sheep, all devour it with great avidity and relish. In fact they will leave most other articles of food, when opportunity offers to get this grass.

3d. The yield of seed (which is said to be of much value for the manufacture of oil) is very great. It yields a crop of seed ranging from twenty to forty bushels per acre, soil and season favourable.

These facts, which can be incontestibly established by the evidence of hundreds of the worthiest farmers in this portion of Iowa, are what has given this grass so great a popularity throughout this and adjoining States. Two years ago every one seemed to regard it as a doubtful experiment, but each succeeding year has won for it new and better commendations. This season it has won immensely on the good opinions of all acquainted with it. It is almost a stranger to failures. It but wants a trial to speedily supplant all other kinds of provender for stock. The stalks and blades are rich in saccharine juices, while the seed is among the very richest grain grown in this or any other country. For Iowa this grass will be of almost incalculable value. The elevated prairies are very unfavourable to the production of the grasses ordinarily relied upon for winter food for stock. None of these last do well in this soil, and consequently can never be relied on here. But the Hungarian grass is a highly satisfactory substitute. I am fully impressed with the conviction that your readers who know nothing personally of the production of which I am speaking, will regard what I have said as a rather *gassy* as well as *grassy* article, but I am conscious that my statements can be fully substantiated by the testimony of the great bulk of farmers hereabouts, and their statements will receive the confirmation of all the loafers, lawyers, doctors, preachers, honest men, and boys in the country.

About four years ago this grass began to be cultivated in this county as an article of provender, by two or three farmers who had got hold of the seed. Now nearly every farmer in the country is raising as much of it as he can get the seed to sow and ground to put it in. In fact numbers of merchants and gentlemen engaged in other business in this vicinity have actually turned their attention, to a considerable extent, to raising this article of food for stock. Quite a number, whom I could name, last spring hired all the ground they could come at and bought seed to sow it at $4, and even $6, per bushel. The result is, they get, generally, about five tuns per acre of the best of hay, worth $6 per tun, as a remuneration for this singular venture. A pretty fair compensation for so small an outlay of labour and capital. This grass is an annual, requiring to be sown each season. It will yield two crops per year on the same ground, in this latitude, but this is generally thought to be too exhausting to the soil. At the solicitation of a friend, I have been induced to give you these simple facts in relation to this article of agricultural production, with a view to advance the interest of a most useful class of our fellow citizens, the farmers, by bringing to their notice, in the older States, an article that needs only to be known to be universally appreciated as the best reliance for food for all kinds of stock raised on the farm.

Albia, Munroe Co., Iowa, 1857. J. N.

Soot in Chimneys, by taking fire, and dropping burning cinders on dry shingle roofs, causes many conflagrations. Most fires in the country originate in this way. Be particular to clean or burn out soot once a month when the roof is wet.

CAN BEEF-MAKING PAY.

A sound maxim in farming is to get manure. More manure, more crops, and more crops more stock, and more stock more manure. So that on a good farm well managed, the tendency should be to increased fertility of the soil, by the sinking therein increased capital in the manure annually applied. We must keep stock. The questions then arise, how can we best dispose of it? Shall it be lean or fat, young or old?

These questions require answers differing much under the conditions of the persons making them, as well as the place wherein made. In the peculiar corn growing regions of the Western States, a different answer may be given from what we should expect in our own State, or in the New England States. I purpose, however, to confine the enquiry mainly to our own State; in the outset presuming, however, that where the farm is adapted for the purpose, no business is so uniformly profitable as a well conducted dairy.

The first consideration is, what does it cost to make a pound of beef? In a former number I showed that it had been satisfactorily settled, that it would require, at least, 4½ lbs. of corn meal to make a pound of beef, and it must be fed to the best advantage to do this. It was also shown that 18 lbs. of good hay would do the same thing, and for the present I shall confine myself to stall-feeding.

The average price of corn in this State is not less than 50 cents for 50 lbs., or a bushel, and $6 per ton for hay. We will allow two tons of hay, or 50 bushels of corn as the product of an acre. An acre of corn will produce, then, 560 lbs. of beef, and an acre of grass, in hay, 222 lbs. The value of the hay would be $12—of the corn $25, so that with hay, it would cost 5 cents and 4 mills per lb., and with corn 4 cents and 4½ mills. But as it would not but be as profitable to feed all hay or all corn, we will feed half hay and half meal, which would make the cost of a pound of beef at 4 cents 9½ mills, or say 5 cents. Allowing a daily consumption equal to the making of 4 lbs. of beef, or rather to the adding of 4 lbs. to the live weight of the animal, the two tuns of hay would feed it for 55½ days, and the corn for 140 days. Putting the corn and hay together, and it will furnish feed for two animals for nearly 100 days—about the usual time for stall-feeding.

No allowance has been made in the foregoing for attendance, interest on cost of animal, nor upon the fixtures necessary for its protection—for without warm shelter the quantity of food must be largely increased to produce the required improvement in the animal. Will the manure pay for these items? Let us see. Von Thaler says that it is safe to estimate the dry food and litter as doubled in weight by its transformation into dung, by which is meant the solid as well as the liquid excrements. Assuming that data, we get six tons and a half of manure, which, if applied to half an acre, would give nearly ten ounces to the square foot—a very liberal manuring—and would add to the productive capacity of the land, in the two following crops, at least fifteen bushels of corn, or its equivalent. We get then, for our trouble in feeding, and the use of capital, $7 50, or nearly one cent per pound for the increased live weight. I would be very willing to furnish barn room and all the necessary litter and attendance for the manure made by stall-fed animals, and would even pay the interest on the cost of the animals while feeding.

The actual cost, then, under the most favourable circumstances, of increased weight of stall-fed cattle is five cents per lb., and good animals for feeding, in high condition, can usually be bought about the 1st of December for from three to three and a-half cents per lb., live weight. The sales from the stables are usually made in about three and a-half to four months, or from the 15th of February to the 1st of March—the average being not far from 100 days. During that time 400 lbs. has been added to its live weight at an expense of $20. Supposing the animal when first put up, to weigh 1,200 lbs., costing on an average at 3¼ cents per lb., $40, and at the 100 days the total cost would be $0 for 1,600 lbs. live weight or 3¾ cent per pound.

That these estimates are more or less liable to variation there is no doubt; but it is quite certain that actual experiment would show a cost more likely larger than smaller. To bring it within even these figures will require a skillful managing of the material used, so that none may be wasted, and all made to produce its full measure of increase. Neither too much nor too little must be given. From what is known now in regard to stall-feeding, is it not safe to say, that at least three-quarters of all the farmers who feed, actually lose money, unless the manure be worth much more than the estimate here placed upon it?

But we are told by our Western cousins that they can beat us out of sight in making beef, and that we cannot possibly compete with them, and this idea has induced many to sell their

farms in this State, and in New England, and go to this land of magnificent promises. Perhaps, after all, the difference in their favour is more apparent than real. Corn will average 20 cents per bushel over the greater portion of the Western States. Now, in their slovenly method of feeding, want of shelter, and proper care, it will require at the least 11 lbs. of corn for 1 lb. of increased live weight—or a bushel of corn will only give about 5 lbs.—making cost 4 cents per lb. Taking the increased expense of reaching market, and the greater loss by shrinkage at 1 cent per lb. against them, and the competition is not very alarming after all. Will somebody correct my figures and theory?

P.

SMOKE FOR WOUNDS ON ANIMALS.

Mr. Editor.—I have two valuable remedies, and not being able to find either of them in any agricultural work with which I am conversant, I place them at your disposal. They are *smoke* and *molasses*. My father once had a vicious horse eight or ten years old, which he altered, hoping to make him more manageable. The operation being not well performed, the cord dropped off, the poor animal bled till he could scarcely walk without reeling, and the parts swelled to an alarming degree, and father having in vain tried every expedient at his command, to remove the inflammation, gave him up for lost, and told me to drive him into the woods and there let him die. Fortunately, at this stage of the case, an old Pensylvania teamster came to our relief, and recommended smoking with old shoes. A smoke was made of old shoes, soles and all, cut to pieces, in a hog trough, and placed under the swollen parts. In a few hours the swelling wholly subsided and the sore commenced discharging matter—the horse was saved.

Some years after this I heard two persons talking about a horse which had been gored in the abdomen. In this case too, everything had been tried in vain. The poor creature must die. At my suggestion he was smoked, and when I next heard from him the old horse was well. So much for *old* wounds.

In the same year I cut my foot with an axe. The lady of the house, seizing the foot while it was yet bleeding freely, held it over a pan containing smoking tag-locks. In a few minutes the bleeding stopped, and the smoke was removed, and a bandage applied to protect it from accidental blows. The wound never maturated, and consequently never pained me. I have seen this remedy tried in many similar cases, and always with the same results. Let the reader bear in mind that no liniment or salve, drawing or healing, should be applied. You have merely to smoke the wound well, and nature will do the rest.

I suppose the smoke of burning wood would produce the same results, but it would not be so manageable. There is a principle in the smoke of wood which when applied to flesh coagulates the albumen, thus rendering it unsusceptible of putrefaction. The same principle stops bleeding by coagulating the blood. It promotes healing, and may be applied with decided benefit to almost all ulcers, wounds and cutaneous diseases. See Turner's chemistry, by Liebig and Gregory, p. 1242.

For chapped hands and lips molasses is the best remedy I ever used. If my cows have sore teats, or an ox chafes off the outer skin so as to occasion the blood to start, I apply molasses.—*Cor. of Country Gentleman.*

The Spanish Horse.—Spain was early celebrated for her breed of horses, The Andalusian charger and the Spanish jennet are familiar to all readers of romance. The subjection of so great a portion of the peninsula to the Moorish sway, by introducing so much of the Barbary blood, mainly contributed to the undisputed excellence of the Spanish horse. One breed, long in the limbs and graceful in all its motions, was the favourite war-horse of the knight; while another race, carrying the esquire, although inferior in elegance, possessed far more strength and endurance. The Spanish horse of the present day is not unlike the Yorkshire breed of England; perhaps with flatter legs and better feet, but far inferior figure.

Medium-Sized Horses.—These are, doubtless, better for common use, than very large ones. They are more supple and active; they require less food; they are adapted to a greater variety of work; and for these reasons they are more readily bought and sold. To secure good medium-sized horses, take a good, compact mare, which weighs from 1,200 to 1,400 lbs., and breed to a horse weighing from 1,000 1,200 lbs. The mare should be larger than the horse, both should be vigorous, well knit, fine-shaped animals.

DR. FITCH'S REPORTS ON THE INSECTS OF N. Y.

These valuable reports issued by Dr. Fitch, on the Entomology of the State, have been read in this country with much interest and profit, and are, we are pleased to see, receiving abroad the commendation they deserve. In France, where this science finds its most profound and thorough students, liberal commendation has been awarded to them. Dr. Lindley in a late number of the Gardener's Chronicle, calls the work of Dr. Fitch, "a very valuable contribution to practical Entomology," and in speaking of the system employed in its arrangement, adds, "Such is undoubtedly the true way of rendering entomological information useful to the mass of mankind; and it is greatly to be regretted that the valuable observations of Curtis and Westwood, in this country, should not be collected and arranged in a similar manner. That Dr. Fitch is an observer of a high order is manifest upon every page of the volume before us; his statements are rarely made at second hand, and where they are so the reader is never led to suppose otherwise. What, too, is very important, the mode of applying to a practical purpose the knowledge he conveys respecting insect manners of life is always kept steadily in view; so that while on the one hand we are told what an insect does, and how he does it, on the other we are instructed in what manner he may be destroyed." After giving several extracts from Dr. Fitch, including most of his preface, Prof. L. says: "We shall occasionally extract other matter from Dr. Fitch's useful work; in the mean while we have only to add that it has an index, which might be taken as a model by some of our careless friends on this side of the Atlantic."

ARTIFICIAL WHALEBONE.

It would almost seem that science, in its rapid march, would finally procure for the great whales of the deep, a respite from the tormenting and deadly assaults of the harpoon. Artificially made oils and fluids are steadily displacing animal products for purposes of illumination, and now by a somewhat recent discovery the bone of the whale is no longer needed to supply our umbrella and skirt makers with skeleton frames. In 1855, Joseph Kleeman, of Meissen, Germany, obtained a patent for a mode of preparing a substitute for whalebone. The process has been put into practice by a firm in New York city, who are turning out about twenty thousand umbrella frames every week! It consists in taking sticks of the common ratan, and soaking them in a liquid extract, for about four days, after which they are immersed in a solution of any of the iron salts, which gives the ratan a deep black dye. Subsequently the sticks are exposed in a close vessel, for the space of about one hour, to the action of steam of about three or four atmospheres' pressure, and then thoroughly dried in a furnace or drying room, at a temperature of about 180 degrees Fahrenheit, when they become ready for the impregnating process.

The sticks are then placed into an iron cylinder, (capable of standing the pressure of at least ten atmospheres) connected by a pipe with an open vessel, containing a varnish made by dissolving 120 parts of shellac, and 200 parts of Burgundy pitch, in 90 parts of absolute alcohol. The air having been exhausted from the cylinder, the cock connecting it with the vessel containing the varnish is opened, when the atmospheric pressure will force the varnish into the cylinders and into the pores of the ratan.

The impregnation of the ratan is rendered more perfect by the use of a pump for forcing the solution into the cylinder. The ratan has now changed its character and become hardly distinguishable from the best quality of whalebone, except that it is somewhat more elastic and less liable to splinter and break. It has gained one hundred per cent. in weight by impregnation. After being removed from the cylinders, or impregnators, but little remains to be done in the way of drying, polishing, and fitting the ends, &c., to prepare it for use for umbrellas, parasols, &c., and various other purposes.—*Scientific American.*

Farmers of the Old School.—Adam was a farmer, while yet in Paradise, and after his fall was commanded to earn his bread by the sweat of his brow. Job, the honest, upright, and patient, was a farmer, and his stern endurance has passed into a proverb. Socrates was a farmer, and yet wedded to his calling the glory of his immortal philosophy. Cincinnatus was a farmer, and one of the noblest of the Romans. Burns was a farmer, and the muse found him at the plough and filled his soul with poetry. Washington was a farmer, and retired from the highest earthly station to enjoy a quiet rural life, and present to the world a spectacle of human greatness.

Potato Yeast.—A New-Bedford lady vouches for the good quality of yeast made after the following recipe :—Cook and mash ten peeled potatoes, pour on a quart of boiling water and stir well, and add a cup of sugar ; let this stand a few minutes ; pour in a quart of cold water, wanting a gill, and when lukewarm stir in a pint of yeast, and set in a moderately warm place to rise. When well fermented, put into a stone jug, cork tightly, and tie the cork down and keep it in a cool place. After the first rising keep enough of this yeast for the second batch. A teacup of this yeast is sufficient for two large loaves of bread ; most excellent it is for muffins and griddle cakes also. There is no need for hops or flour in it, and in my opinion it is the best yeast I have ever tried, and I have experimented in all known recipes.

To Cook Beans.—The way to cook beans, is, to parboil thoroughly, change the water, and after the dish is filled and the meat laid on to bake, sprinkle over the top a table spoonful of sugar to a six quart dish of beans. So says Mrs. James Evans, of this place ; and I can testify to the enjoyment of an excellent dinner of the same, October 23, 1857. I found the beans thus cooked a good thing for a hungry man's complaint.

Clay Cake.—One pound of flour ; 1 pound of white sugar ; half pound butter ; half pint sour cream ; 1 teaspoonful soda ; the whites of 12 eggs. The eggs should be put in the last thing. Flavour with lemon.

Potato Pudding.—Half a pound of butter ; half pound of sugar ; half pound of mashed potatoes ; half gill of cream ; 5 eggs ; 2 tablespoonfuls of brandy ; 1 tablespoonful of nutmeg ; the same of cinnamon. Mash the potatoes with the cream, when cool, add the butter and sugar beat to a cream, then add the eggs, then the other ingredients. Bake in a rich puff paste.

Pop-Corn Pudding.—Three pints of new milk ; 2 eggs ; 3 pints pop-corn ; half a teaspoonful of salt. Every kernel of corn should be popped perfectly and have a white fleecy look. Eaten with a rich cream sauce, it is an excellent and delicious desert. Bake half an hour.—*S. A. Cole, Gorham, N. Y.*

Salt a Universal Remedy.—Mr. Editor.—I had just finished reading Prof. Johnson's remarks on Mr. Cleveland's theory of salt as a "universal expounder" and a "universal remedy," when over went my inkstand upon a beautiful light drab table cover, to my great consternation, as my wife had often cautioned me against this very thing. I rushed for the *salt* cellar, and emptied its contents over the black mass of ink, and in five minutes the stain had wholly disappeared! I doubted Mr. Cleveland's theory before, but ought I to doubt it any longer? There is one point, however, in which my experience differs from Mr. Cleveland's theory—I emptied the salt over and upon the ink, and it descended into the cloth and effected the desired object. One thing is certain, whether salt be a universal remedy or not, viz : *it will surely if applied immediately, prevent ink stains.* A Subscriber.

A Cheap Potato Boiler.—This is a tight box, five feet long, and two and a half wide, with a bottom of good Russia sheet iron, instead of wood. The bottom should be nailed on firmly with a double row of good shingle nails ; in nailing it on, some cloth list should be placed on the edge of the box, to make it tight. The box may be two feet deep ; its top may be made like a batten door. This box should be set on an arch about ten inches high from the ground, and so narrow that the sides of the box are at least five inches away from the fire. The arch hould be neatly built, and be plastered on the top with a little mortar, that the fire may not reach the sides of the box. The arch should be placed near the pig pen, or wherever the food is to be fed out. Other food, besides potatoes, may be steamed in this way.—*Ohio Farmer.*

Spiced Apple Tarts.—Rub stewed or baked apples through a sieve, sweeten them, and add powdered mace and cinnamon sufficient to flavor them. If the apples are not very tart, squeeze in the juice of a lemon. Some persons like the peel of the lemon grated into it. Line soup dishes with a light crust, double on the rim, and fill them and bake them until the crust is done. Little bars of crust, a quarter of an inch in width, crossed on the top of the tart before it is baked, are ornamental.

To Harden Tallow.—W. B. P. sends us a timely and valuable recipe, to wit : "The season is at hand when most farmers are feeding a beef creature for domestic use, and sometimes an animal gets so fat as to yield tallow too soft to make good candles. To harden it, beeswax or alum is sometimes put into the melted liquid, but with indifferent results. If you would succeed perfectly, when the tallow is placed in the kettles to 'try,' put in also one pound of alum in the lump to 20 or 30 pounds of tallow, according to the fatness of the animal. I will guarantee an exemption from soft, greasy candles Try it."

It is not generally known that hog's lard or animal oil of almost any kind, is an antidote to the awful poison, strychnine. Dose : as much as can be got down the patient, and that as quickly as possible.

Soluble Glass Soap.—At a recent meeting in Berlin of the Association for Promoting Industrial Arts in Prussia, H. Wichgraf reported the results of a trial that had been made with the silicate of soda (soluble glass) as a substitute for soap in washing clothes at the prison of Spandau. At this place 5,936 articles of clothing are washed every week. The cost of soaking these with soap amounted to about $5 94, but with the silicate only $1 76. The linen is first steeped for twenty-four hours in a mixture of one pound of the silicate of soda to ten gallons of water, then it is washed with common soap suds rinsed in clean water and dried. The steeping of linen clothes in an alkaline or soap solution prior to washing in the usual manner affords time for the grease and dirt in them to unite with the alkali or soap, they therefore require but little rubbing and labor afterwards. Clothes treated in this manner involve less labor in washing than by the old method, without steeping. A great number of persons in our country pursue this system; still it is not a universal practice.

Buttermilk-Milk Cream.—C. R. D., in the *Ohio Cultivator*, recommends to place Buttermilk when taken from the churn over a slow fire until it scalds. Remove it from the fire and let it settle; pour off the whey and the remainder will be nearly equal to butter for mixing purposes. For winter use put it away in a cask or jar, with now and then a handful of salt as you add more milk.

Apple Custard.—Take half a dozen very tart apples and remove the skin and cores. Cook them until they begin to be soft, in half a teacup of water. Then put them in a pudding-dish and sugar them. Then beat eight eggs with four spoonfuls of sugar, mix it with three pints of milk; pour it over the apples and bake for half an hour.

Valuable Liniment.—As for liniments, the best I know of for horses or human beings, for sprains, swellings, slight, consequent on blows, &c.,) in horses, and sore throats and rheumatism in horse-masters, is as follows:—Equal parts of hartshorn, (aqua ammonia,) oil origanum, olive oil, gum camphor, laudanum and spirits turpentine—all of best quality—to which add three parts good soft-soap. I have used this for several years.—*Cor. Country Gent.*

Cure for Tooth Ache.—If the tooth be hollow, get a small bit of lint or linen, and put a little flour of sulphur into it, soak it in the lint, which wet with spirits of turpentine; put it into the hollow tooth; it gives instant relief.

Remedy for Rheumatism.—Get a small quantity of mustard, well mixed with vinegar, spread it on a linen cloth, and cover the mustard plaster with another piece of linen; sew it neatly round, and apply it to the part affected, and leave it on till it begins to blister.

Plants that may be Raised in Hot-beds.—The time is near at hand when hot-beds should be built, some having already commenced, for the raising of the various salads. North of New York the first of March is quite early enough, with proper care, to raise the various kinds of plants required for the kitchen garden. Of these may be noted cauliflower, brocoli, cabbage, tomatoes, lettuce, peppers, egg-plants, and okra, (those that like it.) A three-light frame will hold enough for a small family—one light of cabbage, another of brocoli, cauliflower and tomatoes; the other, the remaining sorts required. Those who require extra early and strong tomatoes, will find it best to have a frame later in the season built up for transplanting the tomatoes into. This encourages fibrous roots and fine stocky growth, which is increased according to the number of times transplanted. Left till all danger of frost is over, before planting in the open ground, they scarcely receive a check, and commence early to mature fruit. Always give the tomato crop sandy soil if attainable. A few seeds of the various kinds of the cucumber family, may also be sown in a hot bed, (best if in pots,) which are to be planted out after warm weather, and which will come into bearing a few weeks ahead of those sown in the open ground. The end of April a small sowing of celery will be in season for first crop. Never, however, sow the main crop early, as they are far more likely to run up to seed or "pipe."

Small Pox and Vaccination.—Hall's Journal of Health has the following:—"From extended and close observation, the following general deductions seem to be warranted:—First, Infantile vaccination is an almost perfect safeguard until the fourteenth year. Second, At the beginning of fourteen the system gradually loses its capability of resistance, until about twenty-one, when many persons become liable to small pox as if they had not been vaccinated. Third, This liability remains in full force until about forty-two, when the susceptibility begins to decline, and continues for seven years to grow less and less, becoming extinct at about fifty—a period of life when the general revolution of the body begins to take place, during which the system yields to decay, or takes a new lease of life for two or three terms of seven years each. Fourth, The grand practical use to be made of these statements is! Let every youth be revaccinated on entering fourteen; let several attempts be made, so as to be certain of safety. As the malady is more likely to prevail in large cities during the winter, special attention is invited to the subject at this time."

Valuable Discovery.—About three miles from Clear Lake, Napa co., California, and near the borax lakes, is a sulphur bank from twenty to thirty acres in extent, and supposed to be thirty feet thick, sufficiently pure for the use of the mint at San Francisco. The sulphur seems to be constantly forming from a dam, steam rising over the whole surface continually.

How to Examine Wells.—The following simple mode of examining a well to ascertain whether it contains any offensive substances, has been recommended as efficient:—"Place a common mirror over the well in such a position as to catch and throw the rays of the sun to the bottom of the well, which will be immediately illuminated in such a manner that the smallest pebbles, &c., at the bottom, can be distinctly discerned as if in the hand. The sun is in the best situation to be reflected in the morning or afternoon of the day."

Nicotine. - This peculiar principle is a product of the leaves and seeds of tobacco, by infusing them in acidulous water, adding lime, and distilling, and then washing the product with ether, when an ethereal solut on of nicotine is obtained. One drop will kill a dog. It causes the pupil of the eye to contract, has a bitter acrimonious taste, and a pungent smell, and on the whole, is one of the nastiest things in creation. It is composed of 73.26 per cent. of carbon, 9.25 per cent. of hydrogen, and 17.09 per cent of nitrogen. It is related to a class of bodies called vegeto-alkalies, and is capable of uniting with an acid. On the human brain it produces a soothing effect, which is thought very pleasant, but can never be considered otherwise than unhealthy.

Fish Breeding.—A German gentleman named Muller has just put down about five million of the eggs of the Lake trout obtained from Lakes Ontario and Michigan, in streams leading into Lake Salstonstall, Connecticut. He has also put down about a million of the eggs of the white fish in the same lake. It is expected that in two or three years the fish will be of marketable size.

Construction of Stoves.—The desirable points to be secured in the construction and management of stoves, are, first, ready contrivances for regulating the draft; second, accurate fitting in the joining, doors, dampers and valves, to prevent the leakage of foul gases into the room; third, inclosure of the fire-place, with slow conductors, as fire-brick or stone; fourth, a high temperature, attained by the rapid and perfect combustion of the fuel; and fifth, to bring all the heated products or the combustion in contact with the largest possible absorbing and radiating metallic surface, so that the iron in contact with the air may not be overheated, but give out its warmth at a low temperature. Large stoves, moderately heated, are therefore most desirable. The cooler the surface of the stove, or the nearer it is in temperature to the air of the room, the more agreeable and salubrious will be its influence. This desirable result is to be obtained only by exposing the greatest quantity of heating surface to the least quantity of fuel—a condition almost reversed in modern stoves. In Germany and Russia, stoves are commonly made of brick, earthen-ware and porcelain. They are generally made to project into the room from one side, like a chest of drawers or a sideboard, the door for the fire being sometimes in an adjoining apartment. These stoves heat more slowly, and consequently give out their warmth for a longer time than those made of iron.

Platinum.—This metal, which is rather heavier than gold, is of a greyish white color, and is capable of receiving a very fine polish. The tenacity of pure platinum is almost that of iron, and for all practicable purposes it may be regarded as infusible; like iron, it yields to the hammer, and can be welded at a white heat. None of the simple acids will attaek it, and therefore it is used to make vessels for their manufacture, its only drawback being the great expense. It is dissolved by a mixture of nitric and muriatic acids. When in an extremely divided state, platinum has a peculiar property of absorbing great quantities of gas, and also of igniting and becoming red hot in a stream of hydrogen. Platinum was not known in Europe until the middle of the last century, although it was known long before on this continent, where it had received the Spanish name of platina, or little silver. It is found in Peru and Russia, which last country affords about one thousand pounds annually, and about six hundred pounds are given to the world every year by Borneo.

Why Drain Tile are Dearer in America than England.—1st. Men's labor in England is worth but 50 cents a day. In America we pay $1.00. 2d. Horse labor is one-fourth cheaper there than here. 3d. Boys in England, are hired for 25 cents per day, to set off the tile from the machine, and from their being born, as the saying is, with a tile in their mouths, can do it as well as men can here that we pay $1.00 per day. 4th. Tile in England are fetched from the yard by the parties using them, while here they cost to deliver them on board railroad or boats, at least $1.50 per thousand. 5th. Machines cost there about $60, while here the cost is $150. 6th, Bricks to build the kilns are worth bnt £4.80, and there is in each brick 150 cubic inches, while here there is but 62 cubic inches, and their cost is about $4.00 per thousand. 7th. Fire brick can be bought there for $10.00, while here their cost is $40.00 per thousand, same size; the cost for building the kiln is in same proportion. 8th. Money in England, in ordinary times, is worth but three to four per cent, while here it is worth seven. 9th. And last but not least. Coal in England is bought upon an average for $1 75 per ton, and one ton will burn two thousand tile, while here it is worth $7.00 per ton, and poor at that, and requires two tons to burn three thousand tile—and if you burn wood, it will take one cord of wood worth $5, to burn one thousand tile. Tile Making is not all profit; if it had been, tile works in Albany would not have changed hands so much.—*Albany Country Gent.*

Veterinary School.—We notice an article in the Canadian *Agriculturist*, from the pen of Hon. A. Fergusson, on "Veterinary Schools." The writer urges the farmers of Canada to use their means and influence for the purpose of endowing a Veterinary School in Canada. Very good advice; and it comes from the pen of a man who has much influence, and, no doubt, the *agriculturists* will take the hint.—*American Veterinary Journal, Boston, March*, 1858.

Grafting.— We have strange questions asked on the subject of grafting. Dr. Lindley, in a recent lecture, sums up the whole matter thus:—1. A scion will always form a perfect and permanent union with its stock, if both are from the same individual. 2. A scion will generally form a permanent union with its stock, if one is a mere variety of the other. 3. A durable, but not permanent union, may be effected when one species of a genus is worked on another species 4. No union, either durable or permanent, can be expected when stock and scion are widely different. 5. Bad workmanship will render any kind of grating perishable. Grafted plants, then are not necessarily worse than seedlings.

EDITORIAL NOTICES.

New Arrangements!—The present number of the *Agriculturist* has been delayed for some weeks pending certain arrangements between the proprietor and the Board of Agriculture as to its future publication, which are all but completed. The particulars will be announced in the next number. The publication will, hereafter, be conducted under the direct control of the Board, and will, no doubt, be much improved. The price will be kept low, while the quantity of matter, and the labour, time, and expense devoted to the publication will be augmented. Full particulars will be stated in next number.

Agricultural and Horticultural Seeds.—Mr. James Fleming, of this city, Seedsman to the Agricultural Association of Upper Canada, has completed his extensive stock of the different kinds of agricultural and garden seeds, which he warrants fresh and true. He has a large assortment of barley, oats, peas, clover, grass seeds, and Chinese sugar cane, the latter imported directly from the best French growths of last year. From the care which Mr Fleming exercises in the selection of his stock, and the high respectability of the Houses with which he deals, both in Europe and the States, farmers may depend upon being supplied with the best articles at a moderate price.

Patterson & Brother, of Richmond Hill, request us to inform the agricultural public that they still continue the manufacture of their Canadian Reapers, and will be happy to supply all who may favour them with orders. Persons wishing for information will be supplied with circulars by applying to Messrs. Patterson or their agents. We can assure our friends that they may deal with Messrs. Patterson, and be sure of obtaining a well-made machine, at a fair price.

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THE AGRICULTURIST.

This periodical, like its predecessor, the *Cultivator*, has now been before the Canadian public several years, and cannot, we think, have failed in effecting no inconsiderable amount of benefit to the staple interest of the country. The great improvements that have been made of late in our agriculture and its cognate arts, so patriotically encouraged by legislative aid and enactments, and ably seconded by the energetic efforts of enterprising individuals and societies, must have been materially expedited by a monthly journal expressly devoted to the recording of whatever is of importance to the agricultural interest, and to the diffusing of information relative to this indispensible pursuit throughout the Province. These efforts, we believe, have hitherto been far more beneficial to the public than remunerative to the proprietors of these journals. The amount of time and expense required in preparing and publishing a good monthly agricultural paper is much greater than people in general are aware.

Arrangements have recently been completed between the proprietor of the *Agriculturist* and the Board of Agriculture, by which that work will for the future be prepared and published by the latter body. It is to be regretted that owing to causes which could not well be obviated, a temporary suspension of the paper has taken place. The completion of the last sheets of the Transactions of the Board for 1857, for the press, has, among other things, been the cause of delaying for a short time the continuation of the *Agriculturist* in connection with the first sheets of Transactions for the present year. Subscribers, however, may rest assured that every effort will now be made to bring up arrears, and that after a short interval, the work will appear punctually on the first of each month.

As three numbers of the present volume had been issued before the arrangments for transferring the work to the Board of Agriculture were completed, it has been deemed most advisable to finish the volume in the same order of numbering and paging, and of a size to correspond with the Transactions of the Board.

Every endeavour will be used to fill the present number of pages with interesting and useful matter, and it is in contemplation to enlarge and otherwise improve the volume for 1859, by the regular introduction of illustrations, including portraits of some of the more prominent of the prize animals, and cuts of the newest and most important implements and machines, exhibited at the Provincial Shows. It is most desirable that this publication should be so enlarged as to form a complete repertory of agriculture, and the arts relating thereto, for at least this section of the Province. The managers of Agricultural Societies, Mechanics' Institutes, and enterprising individuals, are therefore earnestly requested to furnish the Board with condensed statements of whatever may transpire relative to those pursuits, within their respective localities, that would be interesting and useful for publication. A principal feature of the work will consist of a monthly digest, for the use of the Canadian farmer and agricultural machinist, of what is doing in Europe and America, in relation to all matters in which they possess a common interest. To persons whose time and means are necessarily restricted, we hope our publication will keep them pretty well posted up in these subjects; but to such as possess ampler means and leisure we would strongly recommend other papers than our own; among which may be mentioned, *The Country Gentleman* and *The Rural New Yorker*, excellent weeklies adapted to rural wants and homes; and among the many monthlies, the *Genesee Farmer* and *American Agriculturist*, would amply repay the cost and perusal. We want our farmers—especially our *young farmers*—to observe and experiment, to read and think, and to communicate through the press, the opinions they may form and the results at which they may arrive. In this way we shall gradually accumulate materials for a Canadian Agricultural literature, worthy of this rising Province, and the independent cultivators of our free and fertile soil.

A sheet, separately paged, will accompany the Journal, consisting of the *Transactions of the Board of Agriculture*, comprising Prize Essays, original papers addressed officially to the Board, abstracts of the annual Reports of all the Agricultural Societies in connection with it, together with the official Report and Premium List of the Provincial Exhibition.

Thus, in addition to the value that may attach to its official character, THE JOURNAL AND TRANSACTIONS OF THE BOARD OF AGRICULTURE OF UPPER CANADA, will unquestionably be, at half a dollar a copy, per annum, the cheapest periodical of its kind every offered to the Canadian public.

NEW YORK STATE FAIR.—The Executive Committee of the State Agricultural Society visited Syracuse a few days since, to select grounds and make other preliminary arrangements for the State Fair. They selected the County Fair Grounds and the farm of Mr. Furman adjoining, as the location of the exhibition. The Fair is to be held October 5th to 8th, inclusive. Pamphlets containing Premium List, General Regulations, &c,, may be obtained on application to the Secretary, (B. P. Johnson, Albany,) or at the Agricultural Warehouses in Rochester, Buffalo, Syracuse, Utica, Albany and New York.—*Rural New Yorker.*

THE WHEAT FLY.

THE CAUSE OF ITS INCREASE AND THE CURE FOR IT.—ADAPTED SPECIALLY FOR THE PRACTICAL WORKING FARMERS OF CANADA.

By Edward Lefroy Cull, of the Canada Company's Office, Toronto.

It is now known to all practical farmers, (and the fact has been forced on the attention of many by the entire or partial destruction of their crops) that the Wheat Crop of the Province is every year greatly injured, and its total destruction threatened, by the ravages of the Wheat Fly.

Lower Canada from being a Wheat exporting country, cannot now raise the bread required for her population.

The northern part of the state of New York, has been greatly injured, and the far famed valley of the Genesee has been completely destroyed as wheat producing territories, by the ravages of these insects.

The Midland Districts of Canada for several years ceased to produce Fall Wheat except partially, and now the Niagara District is also desolated by the fly.

It behooves every farmer in Canada, let him be high or low, rich or poor, to examine into the matter, and if a remedy can be found, to assist in applying that remedy, and thus attempt to abate the mischief.

The late extremely valuable prize essay of Professor Hind gives extensive information on the subject, but it is not such as to be within the reach of all, and is too learned and abstruse to be easily understood by many.

There are several kinds of wheat fly; but for the practical farmer they may be reduced into two classes, viz: those which destroy the berry or grain of the wheat, and those which attack the stem.

All the kinds are of the most tender description of fly; they are very small, and do not live through the winter in their winged state.

All wheat flies pass through four states of existence and transformations:

First. The fly, whose existence extends only over a few weeks.

Then the egg, which is laid by the fly, and after depositing which the fly dies.

Then the worm, which is the destroyer of the grain.

And lastly, the Chrysalis in which shape the insect passes the winter months, and from which shape it emerges into the fly the following season.

The researches of those who have studied the natural history of these insects have indicated the time and season of its taking its respective forms, and it is owing to the information thus obtained, that we are enabled to point out (what is believed will be) a cure for the evil.

We shall commence with those insects which destroy the wheat in the ear:—

These are the Midge, the Weevil, and the Caterpillar; there may be others, or these names may by different persons be applied to the same kind, but as they all necessarily come at the same time, and undergo the same transformations, the remedy for all is the same, and the practical farmer need not care, whether it is one or a dozen kinds, that is destroying his grain, so that one method of cure will answer for all.

This kind of insect whilst in its fly shape, deposits its eggs in the new and tender ear of the wheat. The eggs hatch and become worms, which eat the grain or wither and shrink it up.

The worm after having existed a few weeks and fed its fill, becomes a chrysalis. Those which are ready for the change before the grain is harvested, fall to the earth, and bury themselves just below the surface; there they turn into chrysalis form and so remain during the winter.

Those worms which have not come to maturity before the grain is harvested,

go into the barn or stack, with the wheat, and there assume the chrysalis form.

Thus we have our enemy in two places; part (and the greatest number of them), in the field, and the rest in barn or stack. Those in the barn or stack are separated during the thrashing and cleaning of the grain, and if we burn all the chaff, siftings, and seeds, and the worst part of the tailings, we destroy the insect.

If however, we neglect to burn them, and let them go out in the manure, they come forth as flies in due season, and attack the nearest wheat.

By far the greatest number of insects however, remain on the surface of the field on which the wheat was grown, and if they are allowed to remain there undisturbed, until the succeeding spring and summer, they come forth from the chrysalis into the fly shape, and then have the power of removing themselves to the nearest wheat field.

If we would rid ourselves of them, we must destroy them on the ground, before the time comes for them to change into a winged shape.

This can only be done by burying them, none of this kind of worm has legs, they have the power of just burying themselves in the soil; but if they are buried in the soil by the plough six inches deep, and they are allowed to remain so buried until after the time arrives for them to become flies, they are destroyed, for they cannot exist under ground after the time comes for them to assume the fly shape.

The ordinary system of ploughing, if done as soon as possible after harvest, would no doubt do a great deal of good, but owing to its laying the slices moved by the plough one against another, with one edge of the old surface exposed to the air, all those insects which are within reach of the air will still come forth as flies in due season. If ordinary ploughing is attempted as a method of destruction, the ground should immediately afterwards be well harrowed, so as to complete the burying of the insect as deep as possible. Ordinary ploughing cannot be depended on as a cure, it may act as an abatement of the evil.

Double ploughing, or ploughing twice in a place, would bury the insects so deeply, as to keep them safely from again coming forth.

This must be done either with a plough made on purpose, (and there are plenty of such to be purchased,) or with two teams and ploughs, one following the other; both ploughs being set to take the same width of furrow, but the first to take the shallowest cut possible, and the second to take one far deeper. You would thus bury thoroughly the surface on which the insects lie.

Another, and indeed the most important point is, that clover or timothy should never be sown among the wheat, to follow that crop for hay, or pasture. When this is done every worm that falls from the wheat at harvest time comes out next year as a fly, and (as has before been said) goes off to the nearest field of wheat.

All these kinds of fly come *to* the wheat. All those which injure the wheat in the ear come forth in the fly shape in the spring in the field where they were deposited at harvest time, or from the farm or stack yards, and manure heaps. When this fact is once understood, common sense will teach every one the necessity of destroying the insect while it is in the worm or chrysalis state, and thus incapable of locomotion.

It will naturally however, be said by those who read this, and who come to the same conclusions as the writer: what is the use of my taking these precautions, when the chance is that I do not produce the flies from which I suffer? I may farm well, and produce no fly, and my neighbour may produce flies enough to ruin the crop on both sides of him.

The only way to prevent the evil is to make municipal laws to meet it. In places where noxious weeds, such as the thistle, abound, there are township

laws obliging the owners of land on which those weeds grow, to cut them before the seed appears.

A man has no more right to produce wheat flies to destroy his neighbour's crops, than he has to raise wolves to destroy his cattle, or allow mad or mischievous dogs to be at large. Legislation is as necessary in one case as in the other, and the only course to take is to enact by the laws of the municipality.

First—That no clover or grass seed shall be sown amongst wheat.

Secondly—That all wheat stubbles shall be ploughed with the double plough, before the coming of the frost, and that fields so ploughed shall not, during the following spring and summer, be again ploughed, but only cultivated on the surface.

No reasonable person who has at all studied the subject, will doubt that with these precautions the existence and increase of the first class of fly mentioned (viz. those which destroy the wheat in the ear) may be very considerably checked, if not entirely destroyed.

Of the second class of these insects, namely, those which attack the stem of the wheat, there is only one at present known in Canada, this is called the Hessian Fly, but is often known to farmers as the flax-seed worm or grub.

There are two crops of this insect in the year; the first crop attacks the wheat in the fall, the second crop attacks the wheat in the spring.

They come from a fly not larger than the midge, which fly lays its eggs on the blade of the young wheat during September, (and most likely part of October). The eggs hatch into small worms, which make their way down to the stem end of the blade, and between it and the future stem of the wheat, and there fix themselves, and suck the juices of the plant and thus destroy or greatly injure the stems affected.

As, however, the mischief happens during the time the wheat plant is tillering out, the whole of the stems are seldom affected at once, and no doubt the plant, from having some stems destroyed, naturally throws out others, so that the plant is not often absolutely destroyed; but where attacked at all, it is always greatly injured. As winter approaches these maggots or worms change their colour, and become darker and just like a flax seed, and thus take that name. The chrysalis of this worm is formed within the skin of the worm, and this skin forms its winter protection.

It remains in this flax-seed shape until spring is well advanced, when it comes out as a fly and lays its eggs on the leaves and stem of the wheat, only this time it attacks the plant at the second, and even the third joint.

The effect of their constant suction is to weaken the stem of the wheat by preventing the flinty coat forming on the straw, and it then will not bear its own weight but falls down and is destroyed.

This second crop of insects undergo the same changes as the first crop, and again emerge from the straw as flies, and in that shape come to perfection just in time to attack the newly sown fall wheat, and deposit their eggs on the young blade.

This class of insects is much more difficult to deal with and destroy, than those which feed on the ear of the wheat, because you cannot destroy the insect without also destroying the plant of the wheat.

The fall and winter abode of the insect is down in the crown of the plant, often below the surface of the earth, and consequently out of the reach of harm by all means less than the absolute destruction of the plant. You cannot destroy it without also destroying the plant in which it lives, and it is a very hard thing for a man to be called on to destroy the wheat which is to produce his future crop.

Nevertheless the double plough in this case, as in the case of the midge, or

weevil, is the only cure; and where a field is badly affected in the fall, it ought always to be ploughed up, and the insects carefully buried, and the fall wheat replaced with spring wheat.

Where this is found necessary, the spring wheat must be sown on the ground without a second or spring ploughing, for if you plough again in the spring you turn the insect once more to the surface of the ground, and they come forth as flies just in time to attack the newly sown spring wheat.

Fortunately for the human race, by the wise and unerring laws of nature, all insects which feed on vegetables, and amongst them the Hessian Fly, bring with them in a measure their own cure; did they not do so they would so increase as to destroy all crops. The cure (or rather the abatement of the evil) is effected in the following manner.

About the same time that the Hessian Fly appears, there also appears another and much smaller fly. The latter are called Parasites. They search for the eggs of the Hessian Fly, and deposit one of their own eggs either in, or on, the egg of the Hessian Fly; the egg of the parasite hatches in the body of the worm of the Hessian Fly, and continues with it, and feeding on it, until the worm of the Hessian Fly is destroyed.

There are four kinds of these parasites well known, and they attack the hessian fly in all stages of its growth, and it is believed by those who have made the history of these insects their study, that nine out of ten of all the hessian flies which are produced, are thus destroyed. It is in this manner that the numbers of the hessian fly are kept down from destroying the entire crop of wheat.

Sometimes however, the season for the parasites is unfavorable, and they are destroyed by the weather, or some unknown cause, instead of their destroying the hessian fly, and when this is the case the mischief done by the hessian fly is intolerable, and ruinous, and then the farmer is brought to bestir himself, and look out for a cure.

The cures generally sought have been, sowing kinds of wheat which are of so tough and strong a nature as to resist injury, and there are several such, but unfortunately those kinds of wheat are not so profitable to grow, and do not make such good flour, and they are gradually abandoned, and the better sorts again planted, to be in time again swept off by the attacks of the hessian fly; besides which these fly-proof kinds of wheat when often sown in the same locality, after a time lose the power of resisting the attacks of the insects and thus become unavailable.

The double plough therefore is the only certain method of destruction of both classes of insects.

When the evil arises from the midge, weevil, and insects of that class, the insects, in their worm or in their chrysalis shape, must be buried with the stubble in the field in which they were produced, and must remain so buried, beyond the time when in the course of nature they would emerge in their winged shape.

The second class of insects, and the hessian fly, must be destroyed in the wheat plant in which it is formed, by ploughing that plant under, with the double plough, before the coming of the winter, or so early in the spring that the flies have not come forth from their chrysalis form.

All farmers must bear in mind that by raising wheat flies, whether of the one sort or of the other, they do not alone injure themselves and their own crop. If they did injure themselves alone, no one would have a right to say a word on the subject, their fault would bring its own punishment, and would thus cure itself; but this is not the case.

It is useless for farmer Jones to farm well, and destroy all the enemies

which attack his grain, if farmer Smith, whose farm adjoins his, is to be allowed to raise countless hosts of insects, to devastate farmer Jones' crops, as well as those of all his other neighbours.

It is certain that a mischief so general cannot be abated by anything but combined action. If a farm is so isolated that it is beyond the reach of the fly, from its nearest nursery, good farming, ploughing the wheat stubbles in due time and in a proper manner, and burning the chaff, seeds, and wheat offals, after thrashing, will destroy the midge, and all that class of insects, which attack the wheat in the ear, and leave the farmer whose farm is so distant from others as not to be infected, free from the pest, though other parts of the country should be suffering from it. The hessian fly would require a different mode of treatment on such an isolated farm.

The young wheat should be closely examined at intervals during the fall, and as soon as the plant is found to be troubled with the insect, the wheat so affected should be ploughed under in the best possible manner, to be replaced with spring wheat, (which must be sown on the stale furrow) next spring. These precautions (except to a limited extent) could not be adopted in a populous neighbourhood without calling in the assistance of municipal or legislative enactment.

Could we legislate so as to cultivate the Province in counties, or districts, the cure for the wheat fly of both classes could be effected by ordinary cultivation alone. Suppose for instance that County Councils were to give notice, that after a certain period, say one or two years in advance of a specified time, the land in each county should be so cultivated that during one year to be appointed, all the farmers of the county should cease to sow wheat either spring or fall. This need not be applied to the whole Province at once, but to Counties or even Townships. The consequence would be, that the entire crop of the wheat fly (whether of the one class or the other) in the district so cultivated, would come forth in their winged shape in due season, but having no wheat in which to deposit their eggs, would perish, and the district so treated would not again be troubled with the insect, until by imperfect or bad cultivation they were again produced. Such municipal laws as here proposed might be put in force at certain specified times with doubtless excellent effect. It does not appear that there has ever been any special legislation on this subject either in England or America. Some years since Holland was devastated by the wheat midge, and there the legislature ordained, that for either two or three years, wheat culture in the infected districts should be discontinued, and thus a cure was effected.

The sabbath of the land, under the Mosaic Law, (see Leviticus 25th chap. and third and following verses) would have the same effect, and be an absolute cure for all kinds of wheat fly. No doubt Canaan, as well as every other wheat-growing country, was subject to the wheat fly. We know that the Mosaic code of laws was the wisest ever made ; but only the law itself, and not the immediate reason of its being ordained, has descended to us.

Why should not the community in Canada legislate, either in their Municipal Councils or in Parliament, for the destruction of the various kinds of wheat fly. The question is, shall we grow wheat and continue to be a wheat exporting country, or shall we allow an internal pest to devastate our fields and oblige us to raise only the rough and unmerchantable grains? If the matter is not looked to at once, the fly will take it into its own hand, and the whole Province, like those parts now seriously affected, must cease to sow wheat.

The ceasing to sow wheat cures the evil, because it removes the food of the insect, but in a few years after the resumption of wheat growing it will again appear, unless the subject in the meantime becomes properly understood, and

the necessary means for the prevention and destruction of the insect are adopted.

The thing we have most to fear is, that the insect of either, or both classes, may obtain possession of our newly cleared lands. There the proposed cure cannot be adopted, and the ceasing to grow wheat will be the only remedy.

In the old cultivated districts where the plough meets with no impediment, the proposed remedies can be adopted, and must be adopted, in the course of the next two or three seasons, or farewell to the boast of Canada our wheat crop.

ORNAMENTAL PLANTING.

[Read before the Central Agricultural and Horticultural Club, in the Room of the Board of Agriculture, Toronto, March 27, 1858, by Professor Buckland, and published in accordance with a resolution of the Meeting.]

To a person of a cultivated taste, accustomed to the artistic productions and improvements of the old countries of civilized Europe, nothing, perhaps, is felt to be a greater draw-back in this "New World" of ours, than the general absence of those sources of higher enjoyment and pleasing associations, which more or less distinguish refined and old communities. Even in our principal towns and cities, notwithstanding the progress which an improved architectural taste is now happily making, several of the finest houses, and even public buildings, are sadly disfigured, and their expression impaired, and sometimes altogether destroyed, by the most extravagant signs and daubs, indicating the vocations carried on within. In the country the roads and fields are almost invariably laid out in perfectly straight lines, with corresponding rail fences of a zig-zag form, scarcely a solitary tree or bush being left to relieve the deadening monotony, and any effort of art is seldom thought subsequently necessary to hide the repulsive nakedness and deformity of the landscape, that have inevitably resulted from the ruthless and wholesale destruction of the numerous and oftentimes beautiful denizens of the forest, in the usual processes of clearing.

Now, I am far from condemning indiscriminately the whole of what may be conceived or felt as draw-backs and imperfections; several of them being more or less incidental to a new country, only just emerging from the pristine forest. Considered in a mere economical point of view, as adapted to the commencement of settlement in a new country, the laying out of roads and farm boundaries in straight lines, has, without question, several important advantages; while the log hut and zig-zag rail fence, are those which convenience or necessity naturally point out in making the first subdual of wild nature. In the progress of settlement a sort of natural order may be generally traced; the original log hut is in the progress of improvement replaced by a statelier and more comfortable dwelling, erected, perhaps, on a more convenient and picturesque site, the result of knowledge which can seldom be acquired in such situations, but from experience. A garden is laid out, some fruit and shade trees are planted, and the homestead will soon wear an air of comfort and cleanliness, contrasting most favorably with an earlier state of things. Indeed, when the great and numerous difficulties necessarily attendant on the commencement of a settlement in the primitive forest are duly considered, and the generally imperfect knowledge and scanty means of the first settlers, the state of progress that has already been reached in many portions of Canada, cannot be otherwise regarded by such as are capable of forming a sound opinion on the subject, than as highly satisfactory and en-

couraging. The advance that has been made in most of the essential elements of a higher and enduring civilization, both in this Province and many parts of the United States, during the last quarter of a century, can find, I believe, no parallel either in ancient or modern times. I make this remark in no boastful spirit, or with any desire whatever to depreciate the past. With gratitude should the services of our predecessors, living in the earlier periods of the world's history, be remembered and cherished. By pursuing in a truthful and enquiring spirit the same continuous track which they marked out by persevering study and exertion, we shall best fulfil the great purposes of existence, and gradually enlarge the sphere of human knowledge and happiness. The great law of progress is all embracing, traced alike in the physical history of our planet and its living organisms, and in the intellectual and moral constitution of man. The experimental sciences and industrial arts have received during the last few years an astonishing impetus and development, thereby increasing our material wealth far beyond any thing previously known in the history of the race, and what we now peculiarly and most urgently need is a similar progress in the various elevating and humanizing arts, which appeal mainly to taste, imagination, and the continually enlarging circle of human aspirations and sympathies, directly emanating from the moral and social affinities, and spiritual nature of man.

Believing as I do, that there is a voice in nature every where speaking to the ear of enlightened reason, to every earnest minded seeker after what is true and beautiful, in mildest accents of instruction and encouragement, that natural objects, particularly trees and flowers, when tastefully arranged, are admirably adapted to impress and cheer man's spirit, to inspire him with higher purposes and holier aspirations, and render his home more attractive and happy, I have not thought it irrelevant to the general purpose for which we are here accustomed to meet, to request the attention of members of the Club to the subject of ornamental planting.

It is scarcely possible to imagine any spot of earth which does not admit of the ameliorating influences of art. The great object of the landscape gardener, is so to bring out and harmonize the natural features of a place, so as to render their contemplation a source of agreeable sensation and elevating refinement to the observer. It is true that the gratification of a high degree of taste in these matters, will sometimes involve a pecuniary outlay which few settlers in a young country can be expected to bear. But in many situations small means, when directed by sound judgment and correct taste, will accomplish far more in beautifying a place or neighborhood than is commonly imagined.

With comparatively little labor and expense, for example, could the roads of the country, public or private, be rendered far more agreeable to the mind of the traveller by planting on either side, at frequent intervals, the ordinary forest trees of the country. Not only would their shade be grateful during the heats of summer to the traveller, but while beautifying and enriching the landscape, the trees themselves might be made to minister to the physical wants and domestic comforts of their proprietor. Trees, either singly or in clumps, planted around a dwelling house and out buildings, and in the corners of fields, while they extend both to man and beast protection from the parching rays of a summer's sun, and the chilling blasts of winter, are also valuable as timber; an article that is already getting scarce in some of the older settled sections of the country, and its price consequently advancing. On farms having but few specimens of the sugar maple in the forest attached to them, how easy and natural would it be to plant a number of that beautiful and most useful tree by the way side and in the corners of fields. Thus standing singly and exposed, the maple would, like most other trees, fully develope its natural form and character, and yield a larger supply of sugar. Notwithstanding the sugar maple is

somewhat of a slow grower, and parts with the beautiful verdure of its foliage rather early in the season, yet when standing alone, it sends up a tall, stout, clear trunk, with numerous boughs spreading out into a uniform picturesque head, so that I should be disposed to plant it pretty liberally, both in rows and singly, in the park or lawn. The red and white maple are much faster growers, and deserve attention in forming a variety, but their foliage is thin and poor compared with that of the sugar maple. The white or weeping elm, indigenous to our forests, is perhaps the most graceful tree of large dimensions for street planting; but that it may fully develope its lovely pendant branches, it must have plenty of room, and is therefore not well adapted to narrow streets or confined situations. This beautiful tree richly deserves cultivation wherever it will flourish. No plantation or landscape in these latitudes can be considered complete without it. The weeping elm is a tree that cannot fail to gratify the most fastidious taste, and satisfy the highest expectations.

Basswood, or the American linden, is also a highly ornamental tree, possessing an exceedingly rich foliage, and a cleanly appearance. It is easily propagated, grows quickly and bears transplanting well.

The Horse-Chestnut is unquestionably entitled to a first rank among foreign ornamental trees, susceptible of cultivation in this climate; although our late spring and early autumn frosts are sometimes injurious to its growth, and the maturing of its wood. The foliage of the horse-chestnut is peculiarly rich, thick and large, and its flowers—unhappily of very short duration—are really magnificent. A sight more truly gorgeous in the vegetable kingdom of northern latitudes can scarcely be imagined than a long avenue of majestic horse-chestnuts in full foliage, at the time of blossoming. Those who have seen Bushy Park, in the vicinity of London, will need no further illustration of the truth of this remark. Our own College Avenue already attests it each returning spring, notwithstanding the injury which the trees sustained by the breaking of young shoots and branches for the most unwarrantable purpose of getting the flowers and nuts; a practice which, unfortunately, public taste is not yet sufficiently advanced to suppress. And I may here take the opportunity of remarking, that the wilful mutilation of shade and ornamental trees so frequent among us is a perfect disgrace to a civilized, christian people; an outrage alike on the rights of property—public as well as private—and the truth and moral feeling of the community. One of the first lessons acquired by an educated and truly civilized people, possessing the light and experiencing the humanising influence of christianity, is to cherish and admire the grand and beautiful in nature, and the true and lovely in art. I will observe further in this connection, that the practice of allowing swine and cattle to roam at large, unfortunately so common on this continent, is certain to frustrate the planter's object, as far at least as the ornamenting of our highways is concerned, and it is a fruitful source of bad feeling among neighbours, and altogether inimical to the progress of rural taste and beauty. In a word, the practice has grown into an intolerable nuisance and calls loudly for some effectual remedy. But to return from this digression:

The White Ash may be sparingly introduced for street and avenue planting. Its foliage is light and graceful, the tree grows to a large size when it has sufficient room, and is not slow in reaching maturity.

The Beech and Oak—trees which for use, beauty and majesty of expression, have commanded the veneration of ages—are not so well adapted to street planting as those before mentioned; they are slow of growth, and do not bear transplanting so well; yet I should much regret to see either of them wholly rejected from our streets and highways. They ought certainly to occupy a prominent place in parks and lawns of any considerable extent, and should be found wherever a mixture or variety is desired.

Nor ought the American Chestnut to be omitted: besides being a tree of rapid growth when planted in a congenial soil, and of no mean or restricted economic value and application, it possesses, likewise, much grace, dignity and beauty, whether in regard to its stately form, rich and exuberant foliage, or beautiful white flowers. It aids materially in giving variety and expression to the landscape.

The Hickory, though of slow growth, is a tree of luxuriant verdure and pleasing form, justly claims a place among park and roads trees, wherever the soil is suited to its growth. Apart from the richness of its foliage and the beauty of its form, the hickory has strong claims upon our attention for its economic importance in the mechanical arts.

The Acacia, or, as it is now commonly called, the Locust-Tree, being a native of this continent, and so ornamental that no shrubbery or plantation can be considered as complete without it, must claim some attention at our hands. It has been for many year widely diffused in Britain as an ornamental tree, having been early introduced among the first trees from this continent, while what are now the United States were British Colonies. It was formerly supposed to be identical with the Acacia of Egypt, a tree which was imagined by the early missionaries to have supplied John the Baptist with food in the wilderness; and it was from this circumstance it acquired the name of locust-tree. It grows fast while young and will soon ornament a place. The principal objection that can be urged against it is, that it is late in coming into leaf, and parts with its foliage—which, with its blossoms, all must admit to be very graceful—very early. Evelyn recommends it as "deserving a place among our avenue trees, adorning our walks with its exotic leaves, and sweet flowers; very hardy against the pinching winter; but not so proof against its blustering winds." Even in this climate the live wood of the Acacia is in general sufficiently hardy to withstand our our greatest cold, but the earliest frosts of autumn are sufficient to denude it at once of its graceful foliage. The first Acacia introduced into Europe in 1635, was planted in the *Jardin des Plantes*, at Paris, attained the height of seventy-five feet, and is still I believe, alive. About the year of 1815, it showed symptoms of decay, but the branches being lopped, the trunk afterwards shot out with renewed vigor. This is, in all probability, the oldest American tree in the eastern hemisphere.

The wood of the Acacia is said to unite in a very high degree the qualities of strength and durability, and has for many years been used with much satisfaction in some departments of ship building, both in England and America; as was the case in Virginia as far back as 1733. In the year 1823 the celebrated political writer, Mr. Cobbett, undertook what he designated "Rural Rides," in various parts of England, and which he described so graphically in his register. The County of Kent, in which I then resided, was, among other places, honored with his visits. Observing that farmers went to great expense in raising plantations, consisting of different kinds of wood for hop-poles, Cobbett, who had been driven to America some years before on account of the virulence of his political writings, immediately thought of the locust, as being admirably suited to the wants of the hop-farmer, and in all the warmth of an honest enthusiasm, boldly promised the farmers "an everlasting hop-pole." To supply the demand which he had himself created, Cobbett imported enormous quantities of seeds from this continent, turned his garden into a nursery, and "sold altogether more than a million of plants!" Not being able to raise enough to supply all his customers, he purchased large numbers from the London nursery-men, and fortunate did the applicant consider himself, who could purchase at a high price from Mr. Cobbett, the very same locust-trees that, under the botanical name of *Robinia Pseud-Acacia*, were standing unasked for in the nurseries. The hop-planters, however,

were doomed to disappointment, and Cobbett's sylvan prelections turned out to be mere flowers of Rhetoric. The locust is a slow grower in England, except in rich soils and sheltered situations. Besides, its usual form of growth is anything but suitable to the straightness required as an essential quality of a good hop pole.

The Birch is a tree deservedly admired for its own intrinsic beauty. It has well been observed by a modern writer, "as the oak has no tree to vie with itself in the sterner attributes of majesty, dignity and strength, so the

"most beautiful
Of forest trees, the Lady of the Woods,"

stands unrivalled in lightness, grace and elegance. In one respect the Birch even claims precedence over the monarch of the forest, and that one which its slender and delicate form would least lead us to expect: it stands in need of no protection from other trees in any stage of its growth, and loves the bleak mountain side and other exposed situations, from which the sturdy oak shrinks with dismay. But the style of beauty in which each of these trees excels is so different in kind, that neither of them can properly interfere with the other."

The birch naturally belongs to the colder regions of the three northern continents. In the most elevated districts of the Highlands of Scotland it is found to flourish, and in parts of Greenland it is said to be the only tree; but wherever it grows it diminishes in size according to the decreased temperature to which it is exposed, so that in the more northern portions of British America it assumes the appearance of a mere dwarfish shrub. Its peculiar lightness and elegance arising from the slenderness of the main stem in proportion to its height, the wiriness of its branches, the thinness and small size of its foliage, together with the varied colouring of its bark, contrasting well with the dark green hue of its leaves, all combine in rendering the birch essential to the completion of the picturesque in ornamental planting. A weeping variety of this tree is often met with in the mountainous parts of Scotland, Northern Europe and Asia, which is peculiarly beautiful; it is of quicker growth and attains a larger size than the ordinary kinds, and is admirably adapted as a striking ornament to parks and lawns. In the yet more exposed elevations of these northern countries, a distinct species of birch is frequently found, *betula nana*, or dwarf birch, which, as its name denotes, is a low wiry shrub, rarely exceeding three feet in height; with numerous round, notched leaves, which are beautifully veined. Besides the importance of the birch in all descriptions of ornamental plantations, several of its varieties possess no inconsiderable economic value;—the bark being used in the arts for colouring and tanning, and forms an excellent material with which the Indian constructs his light and elegant canoe.

The Mountain Ash is universally admired as an ornamental tree and, as it name implies, is naturally adapted to wild and exposed situations, where having plenty of room it often attains to a considerable size. It equally adapts itself to lower levels and richer soils, but dwindles if planted too thickly, and not allowed plenty of light and air. It deserves a place in every border or garden large enough to raise an ordinary shrub. Woodsworth, the true poet of nature, thus sings:—

"The Mountain Ash
No eye can overlook, when 'mid a grove
Of yet unfaded trees she lifts her head,
Deck'd with autumnal berries, that outshine
Spring's richest blossoms; and ye may have marked
By a brook-side or solitary tarn,
How she her station doth adorn: the pool
Glows at her feet, and all the gloomy rocks
Are brighten'd round her."

(*Concluded in next number.*)

TRANSFUSION OF BLOOD IN THE HORSE.

In a recent number of the *Dublin Quarterly Journal of Medical Science*, some very interesting experiments are recorded by Mr. Jas. Farrell, V. S., on the success which had attended the transfusion of blood from healthy animals into the system of such as were in an advanced stage of disease. In the spring of last year a dangerous epidemic prevailed extensively among horses in Ireland, and, we believe, in several other parts of the United Kingdom. It assumed the leading features of influenza, of a low typhoid character, and was particularly prevalent and fatal in the vicinity of Dublin, and the eastern coast of Ireland. In some instances the disease developed itself with astonishing rapidity. Horses eating their morning food with their usual avidity, and appearing perfectly healthy, would suddenly sicken, and by the evening would evince so much debility as scarcely to be able to stand. The bowels and urinary organs were often violently acted upon, so as to induce symptoms more or less characteristic of bad cases of cholera. In cases where bleeding and drastic purgation had been administered the treatment became much more difficult, and in the generality of instances terminated fatally.

Mr. Farrell opened the jugular veins of a healthy and diseased horse, and by means of an apparatus, mainly contrived by himself, caused the blood to flow freely from the veins of the former into those of the latter, in quantity about three quarts. No particular symptoms were induced until about two quarts had passed, when there appeared to be produced an amount of stimulation indicated by an increased action of the heart, and a dilating of the pupil of the eye. In cases in which more than three quarts had been transfused, unfavorable symptoms followed, indicating the propriety of stopping the operation. On removing the tube, and closing the vein, all symptoms of irritation gradually subsided, and the pulse from being rapid and irritable, became slower and stronger, approaching the natural condition.

In several instances Mr. Farrell's treatment was perfectly successful; the patients beginning to amend in a few hours, and speedily became restored to their usual state of health. "Whatever obstacles and objections there may be to its performance in the human subject, there are none to prevent its becoming a most valuable agent in veterinary science."

GOOD AND BAD FARMING.

It appears that much additional interest has of late been imparted to the great cause of Agricultural improvement in several of the departments of France. The Emperor has offered medals to be awarded to the owners of the best cultivated farms; and, in the distribution of these honors, the opportunity has been embraced by several distinguished men of publicly declaring, what they conceive

to be the cheapest and most efficient methods of advancing the Agricultural interests of the country. In this way, there can be no doubt, a most needful impetus is being given to French husbandry. M. Paul Thenard, a gentleman of wealth, possessing great scientific attainments, combined with an enthusiastic fondness for rural pursuits, has of late distinguished himself in this good work. A few extracts from his last address, as they appear translated in the Scottish Journal of Agriculture, will be perused with interest by many of our readers. The Canadian, like the French farmer, has been in the habit of depending too much upon grain, to the comparative neglect of live stock, apparently unmindful that in these climates the mixed system of husbandry is upon the whole the safest and most profitable. The exertions which the Emperor of the French is now making to introduce some of the choicest animals of the best breeds of Britain, cannot fail to prove highly advantageous. In Canada a similar course has of late years been attended by the most encouraging success. Enterprising importers and breeders may not in all cases have met with the encouragement they deserved; in some instances, it is to be feared, an actual loss has been sustained; but the Province has been greatly enriched and improved thereby. M. Thenard, as reported in the *Journal d'Agriculture Pratique*, observes :—

"All good cultivators will bear me out in what I say, that we must have plenty of forage, and plenty of good forage, for many animals, and for many good animals. Without this there can be no good agriculture. It is, then, for the production of forage, whether natural or artificial, or good roots, that they apply themselves before everything else. For that, besides meadows, they sacrifice the half, and even three-fifths of their arable land; wheat, rape, and the other exportable products of the farmer occupy the least half. But what wheat! what rape! what crops! They are worth twice, and often three times as much as ours. Here, then, the soil is well employed with less manual labor.

"Wheat and oats are of the first importance with us. We devote two-thirds of our land to them; one-sixth to fallow and legumes for consumption at the steading, and the forage plants scarcely occupy the remainder. You see the consequence of such a practice—less manure and more surface, more labor and less return. Further, with us the live stock is a heavy charge; with them it is a great source of profit. Here, then, is a great difference.

"There is still another cause, entirely commercial, which keeps us lower. Though the wheat fail, the stock is saved; the failure of the wheat raises the price of flesh. There is always something got in which everything is lost with us. Remark the causes of this success, which is due much more to the efficacy of the methods than to capital; and therefore, to preserve you from the phantom of progress, do not repeat any longer, 'He is rich, and can do everything; as for us, we are poor, and can do nothing!' Say rather, 'He is rich and can, and ought to go faster, but in going slower, we will arrive at the goal also.'

"Since, then, capital is a means of hastening progress,—and a powerful means too,—see how the celebrated farmers, of whom we have been speaking to day, dispose of their little patrimony. We shall compare their method of acting with ours. Instead of buying fields at a high rate, they invest their capital in the stocking of the farm; and as the capital increases from the profits, they continue for a long time to invest it there; and when there is nothing which the farm wants—when it is sufficiently stocked with improved animals, with superior implements, and when it is in first rate order—it is then that they commence to

place their profits in investments of good security. And when the years have arrived when their children are established in the world, they retire with them to an enlarged domain, which they purchase with a part of their profits.

"Now, how much do they derive from their money invested in the stocking of the farm? In spite of expenses, often considerable, from burning, liming, irrigating, and draining, which they have frequently to do, even on account of these very expenses, they draw from 35 to 41 per cent. What do they do who pass for wise with us? As they derive the smallest profit, they buy a small field here, then another there; and they cultivate it badly, and instead of 35, they scarcely make 4 per cent. from their investments. Then the father dies, and his property, already very much divided, is parcelled out still more among his children, who follow the same practice, which is always to be recommenced.

"Thus, while the farmer who, having confidence in his business, has the courage to place his small fortune in it, arrives by degrees to a life of ease; we, who are deficient in that confidence, from being poor, remain poor; and on account of our bad methods of farming, from being rich, we often become poor.

"Then there is engendered a disgust with the business—there is a desire to give it up; and this is so true, that there are few cultivators in these circumstances who do not long for their children for a place in manufactures, in commerce, at the bar, or some other profession different from their own, so that I who address you, and who have a dread of this sort of things, have every year hundreds of applications for different employments. Now, calculate the number of persons to whom such applications are made, and you will have some idea of the number of applicants; and compute the small number of places to give, and you will arrive at the remainder who are discontented, unfortunate, weak, who are more injurious than useful to society. Such is the deplorable consequence of a bad system of agriculture, and of a bad management of one's means: he is ashamed of and detests the profession of his fathers. And I ask some of you who have been listening to me to-day, and still doubt my words, but are thinking of abandoning your fields for the chances of the towns—to go not far from this, and find the sons of some of those honorable men of whom I have drawn a vivid picture to-day, and ask them what business they are following? and they will all answer with pride, 'The business of our father.'

"The most noble of all the professions is Agriculture, when it is nobly exercised. It is it which nourishes the nation—which gives her her soldiers—which gains her victories. The agriculturist trusts to himself; from God alone he asks for success to his labors; he is independent."

THE PAMPAS GRASS.

This grass, which attains to gigantic dimensions, was introduced into England some three or four years ago; and from its grand and graceful appearance is beginning to attract general attention for its ornament and beauty. It is a native of Buenos Ayres, inhabiting the vast *pampas*, (whence its name), or level plains extending for hundreds of miles in La Plata, and reaching from near the shores of the Atlantic to the foot of the Andes. On these immense plains, (which contain but few varieties of plants, and scarcely any trees or shrubs,) vegetation is exposed at times to extreme alternations of drought and floods—the *pampas* presenting, at certain seasons, all the appearance of a dry and parched

vegetation, and, at other times, of almost unequalled verdure. The period of blooming in England corresponds with the summer of its native land, and it is inferred from its native habitat, that a sunny, open exposure, with a dry state at the roots while in a dormant state, and an abundant supply of moisture while growing, will very nearly approximate to the conditions of its native climate.

From what appears in the *London Florist*, to which excellent periodical we are indebted for the above facts, this grass would seem to promise more for ornament than utility, and it yet remains to be proved whether, even in England, it possesses any agricultural value. It is a fast grower, attaining to nine or ten feet in height, with several stems and fine spikes of flowers in the course of two seasons. We doubt from the little information that has yet appeared respecting its habits, whether it is sufficiently hardy to withstand a Canadian winter without the strictest attention to its culture and protection.

TREATMENT OF ANIMALS UNDER DISEASE.

The following recipes relate to the more common attacks to which farm stock are liable. They are given for the most part on the authority of Mr. Spooner of Southampton, condensed from the very valuable articles which he contributed to *Morton's Cyclopedia of Agriculture*. It is hoped that they will be of some service to Canadian farmers, especially in such situations where a competent veterinary surgeon cannot be procured.

DISEASES OF THE HORSE.

Megrims or *Vertigo*—Giddiness, the result of determination of blood to the head, produced sometimes by a tight collar, often by high feeding. Immediate bleeding will restore the animal.

Inflammation of the Stomach—Shown by dull appearance, with swollen eyelids—pulse 50 or 60 in a minute, and rather strong—abdomen rather distended, bowels costive, dung slimy, legs warm, appetite suspended, and sometimes great thirst, mouth very hot. Bleeding in the first instance, followed by oily purgatives, such as linseed oil, a pint of which may be given twice a-day till the bowels are relaxed. Plenty of linseed gruel should be given, and with it small doses of nitrate of potash, such as two drachms twice a-day, also small doses of calomel and opium, such as a scruple of each twice a-day.

Stomach Staggers consists in distention of the stomach with food, which, from sympathy, produces an oppression on the brain. Treatment—Oily purgatives, assisted by draughts of warm water, and injections containing a purgative. Stomachics may also be given, such as carbonate of ammonia, two drachms; gentian, one drachm; with spirits of nitrous ether, one ounce twice a day. The disease, however, is very obstinate and fatal, the stomach being frequently distended beyond its powers of contraction.

Colic—Gripes—Fret—In flatulent colic the symptoms are sudden and acute pain, which causes the animal to lie down and roll violently, looking round and evincing paroxysms of the most intense agony. The abdomen is considerably distended, which, indeed, distinguishes it from *spasmodic* colic. *Stercoral*

colic is gradual in its approach, and less violent in its symptoms, though, at the same time, longer in duration and more obstinate. The pulse in colic is not much increased, except during the paroxysms of pain, and this, together with the intermissions of pain, distinguishes it from inflammation of the bowels. A draught, containing an ounce of tincture of opium, with two ounces of spirit of nitrous ether, will sometimes afford immediate relief. In the flatulent variety, an ounce of sulphuric ether will be better than the nitrous ether, having a greater effect in condensing the gases; to this an ounce of tincture of aloes or valerian may be added. If relief do not soon follow, the horse should be bled rather copiously, and another draught administered, after which oily purgatives, such as linseed oil, one pound, may be given every four hours till three or four pounds are taken, combined with smaller doses of opium, and half a drachm each of calomel and tartarized antimony. In stercoral colic, the last-mentioned treatment should be adopted at first. Frictions, and even hot fomentations to the abdomen, should follow in obstinate cases, with frequent and copious injections.

Inflammation of the Bowels is a much more dangerous disease. Symptoms —Severe pain, though at first not so violent as in colic. The animal lies down mostly, and looks round at the sides. The pulse quick, and often small and thready; the extremities cold; the membranes of the eyelids and nostrils intensely injected. Bleeding is our sheet anchor. As much blood should be taken as the animal can bear, and if the pulse be weak previous to bleeding, an ounce of spirit of nitrous ether, with the same of laudanum, should be given, after which the horse will bleed better than otherwise. Draughts of linseed oil should follow, and a solution of opium every four hours. Hot applications to the abdomen, and frictions to the extremities should be persisted in, with frequent and copious injections.

Diarrhœa consists in the copious and frequent evacuation of the fæces in a watery state. New oats and hay have a tendency to produce this derangement, as well as fresh grass, or other green food, whilst beans have a contrary tendency. The treatment should consist in an alteration of the food, substituting that of a more wholesome and binding nature; and if medicine is required, the following may be given in thick gruel, made with flour :—

Ginger, powdered	1 drachm.
Gentian, powdered	2 drachms.
Opium	½ drachm.
Prepared chalk	1 ounce.

To be carefully combined, and repeated twice or thrice a day.

Dysentery is another form of disease of the same membrane, which, however, instead of secreting water, as in diarrhœa, has its natural mucous secretion greatly increased. The treatment should consist of moderate bleeding, and the administration of oily laxatives with mild diluents, such as linseed gruel or tea. Nitrate of potash two, and super-tartrate of potash four drachms, may be given with the gruel several times a day, and bran mashes and carrots may be offered as food.

Worms—Horses are subject to these pests in various forms. The most common is the bot, a short thick grub, which is found, sometimes in large numbers, attached to the internal surface of the stomach by a sort of hook. Unless they are very numerous, or are attached to the villous portion of the stomach, they do not appear to be injurious. The *long round* worm is frequently found in the intestines of horses; and, being generally few in number, does not appear to be very injurious. The *tape*-worm is scarcely ever found in the horse; but the *Ascarides* are the most common, and probably the most injurious. They are small, and thread-like in shape, and are found mostly in the large intestines,

and particularly the rectum, where they sometimes cause very great irritation. Treatment—Unless there is really a want of condition, it is needless to resort to treatment, as the appearance of a solitary worm or two in the dung, particularly if of the long white sort, is a matter of little moment. If, however, worms are really numerous, the horse should have bran mashes for a day or two, after which the following may be given:—

Tartarized antimony	2 drachms.
Spirits of turpentine	3 ounces.
Linseed oil	1½ pounds.

To be well mixed together, and given with great care. After this, the following ball may be given daily, for a week:—

Sulphate of iron	1 drachm.
Powdered gentian	2 drachms.
Powdered ginger	1 drachm.
Powdered pimento	1 "

To be made into a ball with treacle. This ball will materially assist in restoring the lost condition.

Catarrh or *Cold* consists of inflammation of the membrane which lines the chambers of the nostrils and the throat. Very slight cases will recover without the aid of medical treatment, a few bran mashes being all that is necessary. In severer cases we must treat according to the urgency of the symptoms. If the pulse is rather strong, as well as accelerated, it is well to bleed. The throat should be well stimulated, externally, with tincture of cantharides. If the bowels are costive, two or three drachms of aloes may be given; but otherwise, the following ball may be resorted to at once, and administered night and morning for several days:—

COUGH BALL.

Nitrate of potash	2 drachms.
Tartarized antimony	1 drachm.
Digitalis, powdered	1 scruple.
Linseed meal	3 drachms.

To be made into a ball with Barbadoes tar. Bran mashes, carrots, and other soft food should be given, and in severe cases oatmeal or linseed gruel.

Bronchitis, or inflammation of the mucous membrane lining the bronchial passages or air-tubes in the lungs, is a very dangerous and insidious disease, often creeping on for several days in the form of common cold, and at length, all at once, manifesting alarming symptoms, which terminate fatally. It is safer in this disease to abstain altogether from laxative medicine, and to bleed moderately, and with the finger on the pulse. We may give the same ball as in catarrh, and besides stimulating the throat and blistering the course of the windpipe, we should insert a seton in the brisket. In severe cases, counter-irritation should be actively resorted to. Good nursing is particularly called for; linseed and oatmeal gruel should be given with grass in summer, and carrots in winter. When the inflammatory symptoms are subdued, it is well to admisister a mild tonic, such as the following:—

TONIC BALL.

Gentian, powdered	2 drachms.
Pimento, powdered	1 drachm.
Sulphate of iron	1 "

To be made into a ball with treacle, and given once a day. Sometimes it may be prudent to omit the iron.

Among chronic diseases, we name *Broken Wind*. Treatment—The horse

should be brought and kept in the highest state of condition, so that he may be able to accomplish ordinary exertion with a less expenditure of muscular exertion, and consequently with less demand on the lungs. The food should be of a concentrated kind, such as oats and beans, so that the stomach should never be distended. Very little hay should be allowed, and no straw, but a fair portion of carrots may be given in the course of the day. If medicine is required, the cough ball recommended for catarrh will be a useful form. Water should only be allowed in small quantities; and the feeding should be so managed, that the horse may not be called upon for much exertion with a loaded stomach. By attention to these measures, great relief can be afforded.

Roaring, if it succeeds an attack of catarrh or influenza, or is accompanied by a cough, is probably owing to thickening or ulceration of the membrane of the larynx; and we should then, by blisters or setons, do what we can to afford relief.

Inflammation of the Kidneys is not a very common disease in the horse. The urine is very dark in colour, sometimes black. There is much fever, with quick pulse, and respiration disturbed from pain. Treatment—Copious blood-letting, followed by a purgative in the form of a draught, with frequent injections. A fresh sheep skin should be applied to the loins, the woolly part outwards, and renewed in the course of twelve hours. This may be assisted by the application or a mustard poultice. Diuretics should be avoided, but a sedative should be given, such as the following, twice a day:—

Tartarized antimony	1 drachm.
Opium	½ "
Protochloride of mercury	1 "
White hellebore	1 scruple.

To be made into a ball.

Diabetes, or excessive staling, is a very troublesome complaint, and sometimes difficult to cure. It is generally produced by unwholesome provender, such as mow-burned hay or kiln-dried oats. Not only is the discharge of urine greatly increased, but it has a sweetish taste, and there is a great falling off of condition. There is also considerable thirst. The treatment consists, in the first place, of a removal of the cause and the substitution of wholesome food, and in the way of medicine, the following ball may be given twice a day:—

Sulphate of iron	1½ drachm.
Gentian	2 drachms.
Ginger	1 drachm.
Opium	½ "

With treacle to form a ball. Water should not be allowed in unlimited quantities, but it is better to satisfy the thirst with thin linseed tea.

Influenza—This disease has raged as an *epidemic* from time to time. It appears to be a low nervous fever, attended with great prostration of strength, and affecting more particularly the mucous membranes, sometimes selecting the air passages, and causing sore throat and bronchitis, and at others confining itself more to the alimentary tract, and producing loss of appetite, nausea, and irritable bowels. Treatment—We cannot do better than commence by giving some diffusible stimulant, such as the following draught:—

Spirit of nitric ether	1 ounce.
Potassio-tartrate of antimony	1 drachm.
Nitrate of potash	4 drachms.
Warm water	10 ounces.

This may be repeated if required. Unless the pulse is somewhat strong, it is better to avoid bleeding, and in all cases it should be practised with moderation.

If the eyelids are much swollen, local bleeding from the lids and eye veins can be practised with advantage. It is rarely necessary to administer aperients, unless there is much costiveness, and then a very mild laxative will be sufficient, such as two or three drachms of aloes, or five to ten drops of croton oil. After the draught has been administered six hours, the following ball may be given twice a day, for several days :—

Protochloride of mercury	2 scruples.
Potassio-tartrate of antimony	2 "
Nitrate of potash	2 drachms.
Linseed meal	3 "

To be made into a ball with soft soap. When the fever is subdued, and debility and want of appetite remain, the following tonic may be administered twice a day :—

Gentian, powdered	1½ drachm.
Pimento, powdered	½ "
Sulphate of iron	½ "
Linseed meal	2 drachms.

To be made into a ball with treacle. If there is sore throat and cough, a liquid blister, such as the acetous tincture of cantharides, should be well rubbed into the throat, and in severe cases a seton may be inserted. When the chest is much affected, the sides or brisket should be blistered. The treatment we have advised must be modified according to the symptoms that may be presented to our notice, as it is impossible to lay down a fixed rule for all cases.

Mange is one of the most contagious diseases to which the horse is liable. It is owing to a very minute insect, called the *Acarus equi*, which burrows under the skin, and breeds with great rapidity. Treatment—The skin should, in the first place, be cleared from all dirt, after which the following liniment should be thoroughly rubbed in, and it is better and safer that the whole of the body should receive a dressing :—

Sulphur vivum	4 ounces.
White hellebore	2 drachms.
Oil of tar	4 ounces.
Linseed oil	1 pound.

To be well mixed together. Plenty of friction should be employed in rubbing in the liniment, for this friction not only insures the better application of the ointment, but is in itself part of the curative treatment. The liniment should be repeated daily for several days, after which the body should be well washed with soap and water, and the application renewed. Of course the worst places should receive the strongest and most frequent applications. Bleeding and physic are useless in this disease.

Chapped Heels consists of a breach in the continuity of the skin at the heels, and is produced by the application of wet and cold to the legs, so as to inflame the skin and parts beneath. Treatment—The horse should be put under the action of a brisk purgative, during which linseed poultices should be placed on the heels. Forced exercise should be avoided, as the motion will prevent the wound from healing, but a loose box may be allowed. After two days, the following lotion should be applied to the heels, and also to the poultices, which may be continued for several days :—

Sulphate of zinc	4 drachms.
Alum, powdered	4 "
Water	1 pint.

As soon as the physic has ceased to operate, diuretics may be given, and, if

necessary, another purgative. After the irritation has been removed by the poultices and other treatment, the following powder may be applied daily to the chap :—

Powdered chalk.....1 ounce.
Sulphate of zinc.....1 drachm.
Alum.....1 "
Bole Armenian.....4 drachms.
Mix.

Grease consists in a very peculiar and offensive discharge from the heels. The treatment should be the same as we have advised for chapped heels, but requires to be more vigorously pushed and longer continued. The occasional application of charcoal will be found useful as an antiseptic, in addition to the other remedial agents. Chloride of lime will also be useful. When allowed to go on unchecked, the heels become covered with excrescence, called *grapes*, which, when they do not occupy a very large extent of surface, may be removed by the knife and caustic, but when they occupy the whole surface of the skin, both of the heels and the leg, a cure is not to be anticipated.

Obstructions in the Gullet, if too far down to be removed by the hand, may be pushed down by a flexible probang, first well oiled, and by its means, with moderate pressure and skill, the body thrust down into the stomach.

Lameness arises from so many forms of foot disease, and is generally removable only by such lengthened treatment, which should be guided by the advice of a veterinary surgeon, that we shall not enumerate here the modes of treatment proper under the several causes to which it is attributable.

Wounds—The treatment of a simple incised wound consists in bringing the divided parts together, and retaining them in such position by sutures or bandages, plasters being for the most part precluded in the horse, in consequence of the hair. In contused and lacerated wounds, a poultice should be applied after the wound is properly cleaned, and the ragged parts removed with a sharp knife, the wound at the same time being sprinkled daily with a little powdered resin. When a healthy surface is secured, the wound may be stimulated daily with a little compound tincture of myrrh, and protected from the atmosphere by an astringent powder, such as the following :—

Prepared chalk, powdered.....1 ounce.
Alum, powdered.....1 drachm.
Armenian bole, powdered.....1 "
Sulphate of zinc, powdered.....1 scruple.

To be well mixed together. Under such simple treatment very formidable wounds may be cured. The proper treatment of wounds in joints consists in closing the joint as quickly as possible, and before inflammation is set up in the cavity. The horse should not, therefore, be walked any distance after the injury, all poultices must be avoided, or left off if previously applied, and if the opening is but small, the application of the hot budding iron to the wound will often close it at once, but if the opening is too large, the frequent application of a saturated solution of the bichloride of mercury, in spirits of wine, will coagulate the synovia, and thus form a temporary plug till granulations can be thrown out.

Operations are often required in the treatment of the diseases of the horse.

Bleeding is a very common operation, and, unless for some local purpose, is usually performed on the jugular vein, which runs on each side of the neck, from the head to the heart. It may be effected either by the lancet or the fleam ; when the former is used, the right is the more convenient side for the

operation, and the left for the fleam. The lancet requires more skill than the fleam. A sufficient quantity of blood having been abstracted, the orifice is closed by passing a pin through the lips of the wound, and winding a little tow round it.

Casting—For the performance of many operations, it is necessary to cast the horse, which is readily effected by putting hobbles or straps round each pastern, to which is attached an iron ring. A rope affixed to one is made to pass through the rings of the other hobbles, and being pulled by several men, the legs are drawn together, and the horse falls, care being taken to direct the fall on a soft bed of muck or straw. Another mode is to use a cart rope, at the middle of which a noose is made, and thrown over the neck; the ends are then passed between the legs and round the heels of the hinder ones, and then through the noose, and being pulled suddenly, the hind legs are drawn forward, and the horse is tripped up and secured. The former mode of casting is much to be preferred, but the latter may be adopted on a rough unbroken colt when the former mode is not admissible.

Blistering is readily performed by rubbing an ointment of cantharides or Spanish flies into the leg or part for the space of ten minutes. The horse should not be allowed to lie down for two or three days, or to reach his leg with his mouth, for although the majority of horses will not injure themselves, occasionally a serious blemish may occur. The following is a convenient form of blister :—

Lard or palm oil.....8 ounces.
Venice turpentine.....1 ounce.

which being melted together, the following ingredients may be slowly stirred in :—

Powdered cantharides.....2 ounces.
Powdered comphor.....1 drachm.

An ounce of the ointment will be sufficient for one leg.

Setoning consists in passing, by means of a seton needle, a piece of tape smeared with ointment under the skin, so as to produce suppuration. A seton may thus be passed from the cleft of the frog to the heel, the needle being curved for the purpose. For a more extended acquaintance with the veterinary art, we recommend the study of the works of the following modern authors—Blaine, Percival, Spooner, Turner, White, and Youatt.

The writings of Mr. G. H. Dadd, of Boston, an eminent American Veterinary surgeon may also be consulted by our readers with much advantage. His *American Veterinary Journal*, published monthly at one dollar per annum, is a most useful periodical, and ought to be in the hands of our principal farmers.

We hope soon to see the important suggestions of the Hon. Adam Fergusson in the last number of the *Agriculturist*, producing some practical result. Canada needs and can support in the best settled districts, regularly educated and experienced Veterinary Surgeons.

Poisoned Hay.—A farmer in Ashtabula, Ohio, complains that he has lost seven head of cattle by their eating poisoned hay. It appears that the poison is in the form of ergot, a smutty excresence which grows on the June grass. It grows as it does on rye, in the shape of a diseased and enlarged seed, of dark color, varying from the size of a wheat grain to three-fourths of an inch long.

RECENT PURCHASES OF IMPROVED STOCK BY THE EMPEROR OF THE FRENCH.

The visit to England some twelve months ago of the Emperor and Empress of the French, appears to have resulted beneficially for agricultural improvement. Mr. Wilson, who is the manager of the royal farms at Windsor, was entrusted by the Emperor to select quite a herd of the best specimens of short-horn cattle that Britain could produce. Accordingly twenty-eight cows and heifers of the breed which takes the very highest rank in the mother country, were recently dispatched to France, with two bulls and eight calves. Of the bulls Prince Alfred had been bred at the Home Farm, Windsor. Master Butterfly 4th, is a son of the renowned Master Butterfly, for whom 1,200 guineas were paid a short time since, by an Agricultural Society in Australia, and from a daughter of Colonel Townley's celebrated cow, Beauty, who has commanded such general admiration. The stock will be located on the model farms of St. Cloud and Versailles. By perseverance in the use of such means, France will be in a fair way of approximating to the high standard which England has long reached in this most important department of a national agriculture.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

Professor Way, who has for several years been the consulting chemist of this Society, has resigned, and Professor Voelcker, of the Royal Agricultural College of Cirencester, has been appointed to fill the vacant post. The former by his patient researches and careful deductions has done much to advance the modern science of agricultural chemistry, and, from what the latter has already effected in this particular department, there is every reason to hope that Professor Way will be followed by a worthy and efficient successor.

The Society's Annual Exhibition will take place this year in the ancient city of Chester, commencing July 19th, the Corporation contributing £1,800 towards the local expenses.

We may also state further that the Exhibition of the Highland Society of Scotland, will be held in the old granitic city of Aberdeen, commencing the 31st of August.

Thorough-bred Horses for Oregon.—Mr. John P. Welsh, who purchased of John B. Burnet, of Syracuse, the celebrated thorough-bred horse *Consternation*, for $3,500, with the intention of taking him to Oregon this season, has, as we are informed by a gentleman who saw Mr. Welsh a few days since, concluded to let *Consternation* stand in Kentucky the present season, to serve thorough-bred mares. Mr. Welsh has purchased in Kentucky, *Rifleman*, a very superior thorough-bred colt of great substance, and promising to be a most valuable horse. *Rifleman*, bay colt, foaled May, 1855, by *Glencoe*, out of the dam of *Marksman and Frazier*, winner of the first prize in the ring for thorough-breds, at the Fayette Co. Fair, held at Lexington, Ky., and also at the State Fair at Paris, Ky., in the year 1856.—*Country Gentlemen*.

OBITUARY.

It is our painful duty to record the death of Mr. William Mundie, Landscape Gardener, at his residence in Hamilton, on the 9th of April, aged 47 years. Mr. Mundie was a native of Aberdeenshire, and emigrated to this Province some twelve or fourteen years since. He was the first to bring into practice the most approved principles for laying out and ornamenting grounds, gardens, cemeteries, &c., as several places in different localities fully testify. Among his earlier efforts may be mentioned, the gardens and shrubberies of several private residences in the suburbs of Hamilton, Toronto, and other places. The Normal School grounds evince the taste and sound judgment which he brought to bear on matters of this sort. Mr. Mundie took a warm interest in all efforts for the diffusion of correct taste and knowledge of the beautiful objects of his profession, as the valuable paper which he read before the Toronto Agricultural and Horticultural Club, on ornamental planting, gardening, &c., and published at the time in this journal, amply testify. His removal is a public loss; but the results of his labors will endure, and long remain as monuments of his professional taste and ability. The writer of this brief notice had the pleasure of an intimate acquaintance with the deceased, both in his public and private relations, for several years, and most cheerfully testifies to the high worth of his character, and the pains-taking spirit and conscientious fidelity, with which he discharged his professional duties. He was a man of deeds rather than of words, and the confidence reposed in his judgment and integrity of purpose, was never found to be misplaced. Let us hope that others will rise up, and carry on to a greater extent and perfection, the work which he so successfully commenced.

No Falling off.—We are pleased, says the *Country Gentlemen*, to learn that breeders of improved stock have so little cause for discouragement in the general dullness that has much diminished or altogether frustrated so many branches of business. The demand for Short Horns, for example, is probably increasing more than enough at the east, to make up for any lack of Western purchasers that may have arisen, partly from the largely increased number of fine herds now in condition at the West to meet the home demand, and partly from the general scarcity there of funds available for transmission. We have recently recorded several sales of short-horns to the New-England States, and may now add the disposal by Mr. Thorne, of Dutchess Co., of a number of superior animals in this direction. Among them are the cows 'Cypress' and 'Constance' to A. H. Beach, Esq., of Merwinsville, Ct., and 'Lady Millicent' to J. H. Thomas, Esq., of Vermont—all imported. We are also informed that Raw Jackson, of Ohio, has recently purchased from the same herd the young bull 'Inca,' and G. W. Coffin, of Dutchess Co., the bull 'Argyle,' got by '2d Grand Duke.' What is rather unusual in so large a herd, we believe that Mr. Thorne has no males now for sale—having already this spring disposed of what could be spared from his herd.

Honor conferred upon an American Geologist.—Prof. James Hall, the Geologist, has been awarded the Wollaston medal by the Royal Geological Society, the first instance of the award of that honor to an American. Since 1856, this medal has been struck in Palladium, in commemoration of the discovery of that metal by Dr. Wollaston.

THE

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OF UPPER CANADA.

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PROVINCIAL EXHIBITION FOR 1858.

We are happy to be enabled to inform our readers that grounds every way suitable for the purpose of the Association have been secured; the Provincial Government having granted to the City Corporation the fee simple of that portion of the Garrison Reserve lying immediately south of the Lunatic Asylum, for the purpose of a Public Park, on condition that not less than 20 acres of said land shall be appropriated for the holding of the Provincial Agricultural Association's Exhibitions, whenever it may be required for that purpose. This ground has been already enclosed by a good and substantial fence, and is now being drained and levelled, and will be, when completed, the best site for the purpose that could probably have been found in the neighbourhood of Toronto; being near to the Queen's Wharf, and in close proximity to the Great Western, Grand Trunk, and Northern Railways—from which a switch is to be immediately constructed, so that goods coming in by any of these roads may be unloaded at the southern entrance of the Exhibition building—thus avoiding the expense and labour of cartage from the different stations.

The ground having been secured, plans for a Building, to be principally of Iron and Glass, were advertised for, and on the 24th of April 13 were sent in in competition for the prizes offered, namely—two prizes of £30 and £20 respectively. Two of these plans having been selected by the Committee, the motto letters accompanying them were opened, when Messrs. Fleming and Schrieber, Architects of this city, were found to be the successful competitors for both prizes.

Certain portions of each of these plans meeting with the approval of the Committee, the Architects were instructed to prepare a modified plan, and on the 22nd of May tenders were received for the erection of the building—Messrs. Smith, Burke & Co., of this city, being the successful tenderers, at the sum of £4,879 10s.

Towards the erection of an Exhibition Building, as a permanent structure, the City Council of Toronto had previously voted the very liberal sum of £5,000, and the County Council of York and Peel the sum of £350, which has been since increased to £1,000, which, added to the appropriation from the County and Township Agricultural Societies, enable the Local Committee to erect a building suited to the purpose for which it is intended, and which we believe (judging from the plans) will be creditable to the Association and to the country; and to which the Committee may with confidence invite Exhibitors to send their goods, without fear of their being injured from weather or other causes—as has too often been the case where temporary buildings only have been erected.

The building—which is being constructed principally of cast iron and glass—will be 256 feet in length, and 144 feet in its extreme width. The total floor space in the building, exclusive of four spacious stairways, will be upwards of 32,000 superficial feet; or 7,000 feet more than was required to be given in the competition designs. The extreme height we believe will be 55 feet.

Great care will be taken, and every precaution used, to have the building of sufficient strength for the immense number of visitors that may be expected to attend. Each of the iron girders will be tested before being placed in the building, by a strain of about three times the weight it will ever be required to carry, so that there may be no risk of accident during the Exhibition. The glass to be used in the vertical walls, is similar to that used in the Dublin Exhibition Building. The roof is to be covered with tin. We believe the building will be very correct in its proportions, and when completed will be pleasing to the eye and appropriate to the purpose for which it is being erected.

So far as we are able to judge, the work appears to be progressing satisfactorily. The stone piers on which the columns are to rest, are mostly finished; a considerable number of the iron columns and girders are in their position, and a large portion of the material for the roof is on the ground, while the tin is being prepared, so that there may be no delay when the building shall be ready to receive it.

Every exertion is being made by the Local Committee to have the whole completed in time, and, under the management of the Building Committee, (composed of Mr. J. E. Pell, Chairman, E. W. Thomson, Esq., W. B. Jarvis, Esq., Rev. Dr. McCaul, Alderman Read, Alderman Brunel, and R. L. Denison, Esq.,) we doubt not that success will attend their efforts.

We would here urge on the artists and manufacturers of the Province, that, as every exertion is being made for the special accommodation and proper exhibition of their various products, they should on their part endeavor to make the exhibition worthy of the building being erected for it, and creditable to our young and rising country.

AGRICULTURAL INTELLIGENCE.

Ring's Patent Broadcast Sower.—The *Rural New Yorker* gives an account of the invention and construction of a machine for sowing broadcast, which is said to perform its work with precision and dispatch. In many situations in this country, owing to stumps, stones, &c., the drill cannot be advantageously used, and as the art of sowing by hand is one which many farmers only acquire imperfectly, machines of the kind in question may be of no inconsiderable service.

The present one was invented by A. Rings, of Maine, and is manufactured and for sale by E. D. Hallock, of Rochester, who says, "it will sow all kinds of grain and field seeds, broadcast, from peas to clover and timothy. It is capable of distributing evenly over the ground a space of from 30 to 60 feet, thus sowing from 60 to 120 feet each "*bout*," and doing the work as well, if not better than the most experienced sower could by hand, besides performing three times the amount of work in the same time. Its construction is simple, being merely a sack with a hopper at the bottom, under which is a revolving cylinder, turned by means of a crank, with arms or tubes through which the grain passes, it being thrown out by centrifugal force. The width of space sown depends upon the specific gravity of grain. The quantity is regulated by a slide, and can be changed in a moment. The machine is made of heavy tin, and can be repaired by any mechanic in that branch of business." The price is seven dollars.

Imported Ayrshire Cows in Lower Canada.—The *Witness* observes: "A vessel now in the port of Montreal has brought six fine Ayrshire cows, selected in Scotland by a French Canadian farmer for and on account of French Canadian farmers in this vicinity. This is an instance of enlightened enterprise which demands special notice and commendation.

ORNAMENTAL PLANTING.

BY PROF. BUCKLAND.

(*Concluded from page* 84.)

All the trees which have been enumerated in the preceding part of this paper are easily attainable—besides others which I have not time to particularize—are generally adapted for planting, either singly or in groups, in grounds of sufficient extent. In lawns, however, of *very small area*, it is not advisable to plant trees that attain to a great size. *Variety* is also an object to be sought as far as practicable in all situations; and a fitness or adaptation should always be observed in accordance with the dictates of correct taste, both in outline and detail, in every thing that is attempted in landscape gardening.

In selecting trees for ornamental planting in the immediate vicinity of the dwelling house, ample scope is afforded for the exercise of taste and judgment, as pointed out so fully by Repton, and other writers, on these subjects. Trees, in their contour and general expression, should, as far as practicable, harmonize or contrast with the style of architecture with which they are associated. Styles, for instance, which abound in horizontal lines—such as characterise the dwellings of the classic lands of Italy and Greece—are mellowed and their characteristic features more fully and pleasingly brought out by trees of a tall and spiral

growth;—such as the Larch, the Balsam Fir, the Spruce, the Hemlock, and the Lombardy Poplar. The Gothic style, abounding in perpendicular lines, with pointed roofs, is much more effectively exhibited by trees of an opposite character—those that possess massive towering tops—such as the Oak, Elm, Maple, Beech, Bass Wood, &c. Besides, in ornamenting grounds, it is desirable to introduce as much variety as possible; yet the extent of the grounds, the character of the soil, situation, and climate, and also of the size and style of the house and buildings, these constitute the principal elements in determining the numbers, kinds and arrangement of the trees for ornamental planting. In a lawn of very limited area trees of the smaller kinds are more in keeping, and afford greater variety of scenery, than a less number of a larger growth. In fact, in such a situation a dozen large forest trees planted sufficiently wide apart to enable them to attain to their full natural size and beauty, would occupy nearly the whole available space. In laying out a place, then, it becomes a matter of primary importance, one indeed frequently neglected in practice, viz: To maintain throughout in the various details, those just and harmonious proportions, which will give to the whole the pleasing and necessary attribute of unity.

The limits usually assigned to a single paper are such as to forbid the introduction of many particulars. I will, however, just refer to a few by way of suggestion that may probably be of some small use to such as contemplate the laying out of new grounds, or the improvement of old ones.

Perhaps the commonest mistake committed by amateurs, and occasionally even by professional landscape gardeners, is *attempting too much*. All true natural beauty is characterised by simplicity. Persons unaccustomed to generalize, who are incapable of taking in a number of objects at a glance, and of determining the character and effect of their combination, must be quite unequal to the task of setting out a lawn or shrubbery in a tasteful and pleasing manner. The whole of the principal outlines should be finally settled before any operations are commenced; for, to arrange and plant grounds piece-meal not only involves much unnecessary trouble and expense, but will be sure to end, more or less, in disappointment. A common source of error which should be most carefully guarded against, arises from the somewhat natural desire of introducing to one's grounds whatever novelty may be observed in others that seems pleasing to the eye, without due regard to its fitness for the locality, or its relation to what has previously been done.

A place may be irretrievably injured by being too much broken up in its *general arrangement*; and owners of small grounds are peculiarly liable to this mistake. In such situations attempting to introduce the features of extensive grounds, by adopting all their detached portions in miniature, and planting too largely, borders so nearly on the ludicrous that it will be sure to excite ridicule by violating the relations of harmony, and the most obvious dictates of correct taste. In all places—more particularly in moist climates and under clouded skies, characteristics, by the bye, not generally pertaining to Canada—sufficient open space should always be left in grass, to show the extent and figure of the grounds to advantage, as well as to admit the necessary amount of light and circulation of air, to promote the growth and healthy condition of trees and flowers.

It is objectionable in every way to plant thickly immediately around or close to a house, unless it be to hide some offensive deformity. In a climate like ours some amount of shade to a dwelling house is a means of comfort during the heats of summer, while trees afford a desirable shelter against the strong and piercing winds of winter. *Thick* planting, however, not only obscures the house and excludes all prospects of the surrounding scenery from its windows—objects in themselves of great interest and importance to secure, but it sometimes has an

injurious effect on the health of the inmates, by causing dampness and too great an exclusion of light and air.

Belts or strips of trees, forming the boundary lines of small grounds, are quite inappropriate, confining the view, and causing a place to appear much smaller than it would do by a more natural and picturesque distribution of plants and trees. These belts also create in the minds of the observer, the disagreeable feeling of confinement, and they ought never to be employed for the purpose of securing privacy, unless under peculiar circumstances, when there is something positively objectionable which it is desirable to hide.

Mounds and clumps should be only sparingly introduced; they require to be disposed with a sound judgment and cultivated taste, or they will appear but little better than disfigured spots on the landscape. Except in large domains, or situations where it is necessary to hide adjacent buildings or objects, *Avenues* are not to be generally recommended. When planted in straight lines they become too monotonous to be highly pleasing;—gentle curves greatly increase their beauty, and give the observer an impression of more extensive grounds, and consequently of the higher station and wealth of the owner.

The strictly geometrical style of planting should always be avoided, except in large grounds, and even then its details require to be extremely simple. An elaborate and complicated arrangement of parts looks exceedingly artificial, and ill accords with the simple beauty and majesty of nature. Many places, more particularly small ones, convey to the mind of a discriminating observer a feeling near akin to the ludicrous, mainly arising from the violation of this simple natural law. The great thing to be observed in ornamental planting is to adapt the number, sorts and arrangement of trees to the size, situation, and leading purposes of the grounds; to avoid all unnecessary crowding together of ornaments, and to make art the *handmaid* rather than the *mistress* of nature. In no portion of the world are the true picturesque laws of landscape ornament better understood, or more successfully practised than in the British Islands;—from the simple flower garden and embowered cottage of the peasant, through various gradations, up to the stately mansions, parks, and pleasure grounds of titled landowners or merchant princes: nay, to complete this beautiful chain of associations, we may ascend to a yet higher link, and include the royal and time-hallowed residences of monarchy itself.

The subject of fences, whether viewed in reference to ornamental grounds or the ordinary divisions of the farm, is one of great interest and importance. Rail fences are the only kind at first adapted to a densely wooded country like Canada; and although they detract much from the beauty of the landscape, several generations must pass away before they will be generally superseded by living hedges. There are, however, a number of old settled parts of the country in which fencing timber is already getting scarce, and consequently dear; especially near large towns and cities, where live fences might be attempted both with economy and success—a change that would add much to the beauty and richness of the scenery. The *Buck thorn* has been sufficiently tried in some parts of the neighbouring States to warrant the conclusion that it is well suited for making hedges in our northern latitudes;—it being easily raised from seed, a fast grower, quite hardy, and when properly trained it produces a strong, uniform, and handsome hedge, quite adequate for all ordinary purposes of defence. There can be but little doubt, also, that the common thorns indigenous to Canada, would, under proper treatment, answer for hedges admirably well. The principal things to be attended to are, to place the young plants carefully in well prepared soil, cutting back moderately every year the perpendicular growth; keeping the sides well trimmed so as to encourage width and thickness of growth at the bottom, gradually narrowing off to the top. This form is not only the one most pleasing

to the eye, but it does not allow so great a weight of snow to lodge on the hedge as would otherwise be the case. No hedge can flourish if placed in the shade, or near large trees; and every thing depends upon the attention and kind of treatment it receives, particularly during the first half-dozen years. Indeed this remark applies with equal force to all species of planting. A tree, it should be remembered, is a thing endowed with the wonderful and mysterious principle termed *life:* it is an organic structure, abounding in cells and vessels, many of which are of the most minute and delicate texture. The plant, unlike the animal having no power of locomotion, must passively submit to the influence of the conditions in which it is placed, and the influences by which it is surrounded. Yet from the manner in which planting is commonly performed, trees might be thought to be as hardy as stones. To tear a young tree from the seed bed or the forest, thereby mutilating its roots, which are frequently exposed for several days to the parching action of the sun and air, and then digging a hole scarcely large enough, perhaps, to receive without compression, what roots remain, and after carelessly filling in, pronounce the work of planting done. The results of this fatal mistake are unhappily to be seen, more or less, everywhere. What large numbers of plants under such treatment die the very first year! how many keep up for a series of years what perhaps is even worse, a constant struggle between life and death, a phenomenon any thing but pleasant for an educated eye to look upon; and it may well be asked how very few indeed—by what must be considered the merest chance—ever reach the point of perfect maturity, and their natural proportionate development.

For planting of any kind to succeed, the ground must in the first instance be deeply worked, and when necessary manured and drained. The young plants should be carefully removed, and as carefully placed in their new and final situations; the depth to be regulated, in some degree, in accordance with the natural habits of the tree, but *deep* planting, especially in wet soils, must in the generality of cases inevitably result in failure. Nor is the planter's care at an end when the young tree has been placed in the ground, even though the most liberal and scientific preliminaries may have been scrupulously observed. The *after management*—especially in case of fruit trees—such as loosening the surface and keeping down weeds, occasional manuring or mulching, (the latter a practice in our hot summers of the greatest benefit) judicious pruning, and protection against cattle, swine, and even insects, as far as it is practicable, is absolutely necessary to insure uninterupted progression, and complete and final success.

But I must draw these, which I cannot help feeling will be thought somewhat desultory observations, to a conclusion. I am unwilling, however, to do so without adverting distinctly to the great importance of promoting through our public institutions and by all the practicable means in our power, the knowledge and love of nature and of art among the great masses of the people. To enlarge their minds and the exercise of their social sympathies, and to purify and elevate their tastes, should be the great work which all who are friendly to the advancement of their country and race should undertake in an earnest and hopeful spirit. To form that habit of mind which enables us to associate with all the works of the Creator, reverential and elevating feelings, opens up an unfailing source of true and permanent enjoyment. The beautiful as well as the sublime in landscape has a moral, a refining, and an ennobling power over the soul, favorable to the growth of the higher virtues, and of a pure and exalted piety. The intelligent observer of nature cannot fail to find,

> "Tongues in trees,
> Books in the running brooks;
> Sermons in stones,
> And good in every thing."

THE PROGRESS OF ENGLISH AGRICULTURE.

[The subjoined article from the current number of the *Quarterly Review*, we are tempted, from its great intrinsic value and practical applications, to give entire. It scarcely admits of abridgment, and it will no doubt be read with both profit and pleasure by many of our readers. To trace the various stages of the advancement of agriculture in England, will afford a generally correct indication of the way which we must pursue in Canada, in order to secure similar results. We should be happy to see a similarly able pen employed on the history and progress of Scottish and Irish Agriculture, thereby covering the entire area of the British Islands.]

In the year 1856 a few Englishmen accepted the invitation of the French Government, crossed the Channel with their best live-stock and implements, entered into competition with the picked agricultnral and mechanical skill of continental Europe, and found themselves by a long interval first in the arts and sciences required for producing meat and corn in the most economical manner, under a climate not eminently favourable, and on land which has long lost its virgin fertility. This is the problem which modern cultivators have to solve.

The live-stock of the British Islands are distinguished for three merits—the early period at which they become ripe for the butcher, the great amount of food they produce in return for the food they consume, and the large proportion of prime meat which they yield.

The agricultural implements of England are distinguished for solidity of construction, simplicity of details, and economy in price, as well as for the rapidity and completeness with which they execute their work—especially that class of work which in other countries is more imperfectly and expensively performed by the labour of men or cattle.

The best evidence of the superiority of British live-stock and agricultural machinery will be found, not in the premiums and medals awarded to them in Vienna or Paris, but in the constantly increasing exportation of both to every part of the world where scientific cultivation has superceded the rude expedients of earlier times. As to implements, said the Earl of Carlisle, in addressing an agricultural gathering of Yorkshiremen, "I saw on the plains of Troy the clod-crusher of Crosskill, the drills, the horse-hoes of Garrett, and the ploughs of Howard and Ransome." On the banks of the Danube, Scheldt, and the Po, of the Mississippi and the Amazon, on the shores of the Baltic and the Black Sea, in the new continent of Australia, or in Flanders, the cradle of modern agriculture, English implements have the same preference as on the plains of Troy.

Farmers are prosperous, landlords are intent on improving their estates, labourers have ceased to hate the drill and the threshing machine; during the past harvest the reaping machine has come into working use; and competent judges are of opinion that an economical steam-cultivator has been almost perfected. The time seems propitious for reviewing the series of events which during the last hundred years have combined to place English agriculture in the position which it now by universal consent enjoys. Different men and different means have, in important particulars, founded the agricultural prosperity of Scotland, although the two kingdoms have more than once exchanged improvements. A Scotchman only can do justice to the unwritten history of Scotch agriculture.

There is rarely a great invention received by the world of which the germ is not to be found in some preceding age. This is the case with the system of

artificial manures, which has recently worked such wonders in agriculture, and which is touched upon as follows in "The new and admirable Arte of Setting Corne," by H. Platte, Esquire, published in 1601 by "Peter Shorte, dwelling at ye signe of ye Starne on Bred Street Hill:"—

"Shanvings of horne, upon mine own experience, I must of necessity commende, by means whereof I obtagned a more flourishing garden at Bishopshal, in a most barren and unfruitful plot of grounde, which none of my predecessors could ever grace or beautifie either with knots or flowers. I have had good experience, with singular good success, by strewing the waste sope ashes upon a border of summer barley. Malte duste may here also challenge his place, for foure or five quarters thereof are sufficient for an acre of ground. And sal armoniake, being a volatile salt first incorporated and rotted in common earth, is thought to bee a rich mould to plant or set in. Dogges and cattes and other beastes, and generally all carrion, buried under ye rootes of trees, in due time will make them flourish and bring forth in great abundance."

Thus we find that so long as two hundred and fifty-seven years ago an Englishman "had discovered the utility of ammonia in bones and flesh." Even in agricultural implements great inventions were suggested, and forgotten, because the farmers of England were not prepared to receive them. The reaping-machine carries us back to the agriculture of the Gauls. The horse hoe, the drill, and the water or wind driven threshing machines were employed in a few obscure localities, but it was not until necessity made farmers adventurous, and facilities of communication rendered one district conversant with the doings of another, that they grew into general use. Whatever, therefore, might have been effected on particular estates, the condition of English agriculture at the close of the eighteenth century nearly resembled that of the greater part of continental Europe at the present time. Wheat in many districts was rarely cultivated and rarely eaten by the labouring classes. Rye, oats, and barley were the prevailing crops: a naked fallow, that is to say, a year of barrenness, which was too often a year of exhausting weeds, was the ordinary expedient for restoring the fertility of soil. Farm-yard dung, exposed to the dissolving influence of rain, and carelessly applied, was almost the only manure. Artificial grasses, with beans, peas, and cabbages, were rarely grown, and turnips were confined to a few counties, where they were sown broadcast. Cultivation (except ploughing and harrowing) was performed almost entirely by manual labour; the rude implements were usually constructed on the farm, and often in a way to increase labour instead of to economize it. The cattle were chiefly valued for their dairy qualities or for their powers of draught, and were only fatted when they would milk or draw no longer. The greater number of breeds were large-boned and ill-shaped, greedy eaters, and slow in arriving at maturity: while, as very little winter food, except hay, was raised, the meat laid on by grass in the summer was lost, or barely maintained, in winter. Fresh meat for six months of the year was a luxury only enjoyed by the wealthiest personages. Within the recollection of many now living, first-class farmers in Herefordshire salted down an old cow in the autumn, which, with flitches of fat bacon, supplied their families with meat until the spring. Esquire Bedel Gunning, in his "Memorials of Cambridge," relates that, when Dr. Makepeace Thackeray settled in Chester about the beginning of the present century, he presented one of his tenants with a bull-calf of a superior breed. On his inquiring after it in .he following spring, the farmer gratefully replied, "Sir, he was a noble animal; we killed him at Christmas, and have lived upon him ever since."

The reclaiming wild sheep walks, an improvement in the breeds of live stock, an increase in the quantity of food grown on arable land for their support, and a better rotation of crops, are the events which distinguish the progress of

English agriculture during the last century. The next step, after some advance had been made, was to break down the barriers which separated the farmers of that day, and which left them nearly as ignorant of what was going on in every district besides their own as of what was passing in China or Japan. The active agent in this work was the son of a prebendary of Canterbury—the well-known Arthur Young, one of the most useful and sagacious, if not one of the most brilliant of men. Within the last twenty years, railways, the penny postage, and a cloud of newspapers have rendered personal and written communication universal. Let a superior animal be bred, an ingenious machine invented, or a new kind of manure be discovered, and in a few days the particulars are circulated through the press round the whole kingdom, and bring visitors or letters of inquiry from every quarter. But in the time of Arthur Young the most advanced counties communicated with the metropolis and each other by thorough-fares which could hardly be traversed except by a well-mounted horseman, or a broad-wheeled waggon drawn by twelve horses, while as "not one farmer in five thousand read anything at all," the printing-press could not supply the place of personal inspection. Norfolk, with a subsoil which allowed the rain to filter through, boasted her natural roads, and the inhabitants quoted with pride a saying of Charles II., that the county ought to be cut up to make highways for the rest of the kingdom. But this only proved how deplorable was the condition of the other parts of the country, for when Young visited Norfolk he did not meet with a single mile of good road. In Essex he found lanes so narrow that not a mouse could pass a carriage, ruts of an incredible depth, and chalk-waggons stuck fast till a line of them were in the same predicament, and it required twenty or thirty horses to be tacked to each to draw them out one by one. The thorough-fares in fact were ditches of thick mud cut up by secondary ditches of irregular depth. In attempting to traverse them, Young had sometimes to alight from his chaise, and get the rustics to assist him in lifting it over the hedge. Such was the state of things when, in 1767, he abandoned the farm in which he had experimented too much to be successful, and, availing himself of the frank hospitality which has in every age been the characteristic of our farmers and country gentlemen, made those celebrated "Tours," which are absolute photographs of agricultural England, and are models of what all such reports should be—graphic, faithful, picturesque, and philosophical! His work, however, affords numerous instances of the danger of any man pronouncing opinions upon subjects which he has never studied. His candid confession that he has no technical knowledge of the fine arts does not diminish the absurdity of the judgments he frequently passes upon the houses and paintings he met with in his journeys. He viewed the human form in much the same light that he regarded cattle for the butcher, for after enumerating three pictures by Rubens at the seat of Sir Gregory Page on Blackheath, he adds, "They are fine in his general style; the females *capitally plump.*" Of a poulterer's shop in the same collection he says, "The exact imitation of the basket will make you smile with pleasure." Nothing more can be required to show that he looked at paintings with the eye of an agriculturist.

About half a century after Young had published his principal English tours, another celebrated man copied his example, and made his "Rural Rides" through various counties between the years 1821 and 1832. It would be natural to refer to this entertaining work of Cobbett to discover the changes which had taken place in the interval, but scarce a notion can be gleaned from it of the condition of agriculture. Superior to Young in talent, in force of language, and in liveliness of style, though not surpassing him in lucidity, which was impossible, he is, beyond comparison, inferior to him in information and candour. The "Rural Rides" are little better than a collection of reckless invectives, hardy assertions,

and insolent bigotry. Clever as is Cobbett's abuse, it derives much of its amusement from its effrontery and its ludicrous disproportion to the occasions which excite it, like the fits of passion of Sir Anthony Absolute. His very prejudices raise a smile by their extravagance, and it is no paradox to assert that a large part of the merit of the book is in its faults, if there is merit in a piquancy which the reader relishes while he condemns. Beyond a certain perception of the beauties of Nature, there is an entire absence of elevating sentiment. His ideas for improving the condition of the peasantry, about which he talked so much and so furiously, usually centre in fat bacon and strong beer, the superiority of which to Christian instruction is one of his favourits vaunts. The ministers of religion of all sects had a determined opponent in him, and he classes them among the pests of society. "Coming," he says in his "Rural Rides, through the village of Benenden, I heard a man at my right talking very loud about *houses! houses! houses!* It was a Methodist parson in a house close by the road-side. I pulled up, and stood still, in the middle of the road, but looking, in silent soberness, into the window (which was open) of the room in which the preacher was at work. I believe my stopping rather disconcerted him, for he got into shocking repetition. Scarcely had I proceeded a hundred yards from the place where this fellow was bawling when I came to the very situation which he ought to have occupied—I mean the *stocks.*" And then he proceeds to bawl himself upon the uselessness of stocks unless the legs of Methodist parsons are seen peeping out of them. This was the toleration of a man who assumed to himself a greater license in speaking and writing than any other person of his age, not even excepting O'Connell, and who was always demanding unbounded liberty to say anything however extreme, in any language, however virulent. But his inconsistencies of opinion and conduct were endless. "I got clear of Tunbridge Wells," he relates in one part of his "Rural Rides," "by making a great stir in rousing waiters and boots and maids, and by leaving behind me the name of a noisy, troublesome fellow." This seems to have been his pride in his works as well as his travels, and, provided he could be noisy and troublesome, he cared not at all to be just or decent. Devoting a large portion of his life to agriculture, and having won by his talents and his pungency the ear of the public, he did nothing whatever to advance the science. His powerful and reckless pen was chiefly employed in maintaining errors; and while Young, by the accurate record of impartial observations, has left his footmark deeply printed upon the soil, the turbulent cleverness of Cobbett was like a wind which makes a great stir at the moment, and then is hushed for ever. The name of Arthur Young will always be mentioned with gratitude in every record of British farming; the name of Cobbett, if it is mentioned at all, will only be quoted as a warning. On recurring to his "Rural Rides," we have found them next to a blank upon the subject of which they profess to treat; and though abuse, egotism, conceit, dogmatism, and prejudice, when set off by vivacity, may make amusing reading, they contribute nothing to the promotion of agriculture.

Foremost among the men whose merits Arthur Young helped to make known to his contemporaries and hand down to posterity, was Robert Bakewell of Dishley; a man of genius in his way, for he laid down the principles of a new art. He founded the admirable breed of Leicester sheep, which still maintains a high reputation throughout Europe and the United States of America; and although he failed in establishing his breed of "Long-horn cattle" and of "black cart-horses," he taught others how to succeed. The yeoman farmer had not yet removed to a "parlour," and Bakewell sat in the huge chimney-corner of a long kitchen hung round with the dried joints of his finest oxen, preserved as specimens of proportion, "a tall, stout, broad shouldered

man of brown-red complexion, clad in a brown loose coat and scarlet waistcoat, leather breeches, and top-boots. There he entertained Russian princes, French and German Royal Dukes, British peers and farmers, and sight-seers of every degree." Whoever were his guests, they were all obliged to conform to his rules. "Breakfast at eight o'clock, dinner at one, supper at nine, bed at eleven o'clock; at half-past ten o'clock, let who would be there, he knocked out his last pipe. There he talked on his favourite subject, breeding, 'with earnest yet playful enthusiasm;' there, "utterly indifferent to vulgar traditional prejudices,' he enumerated those axioms which must ever be the cardinal rules of the improvers of live stock. "He chose the animals of the form and temperament which showed signs of producing most fat and muscle," declaring that in an ox "all was useless that was not beef;" that he sought, "by pairing the best specimens, to make the shoulders comparatively little, the hind-quarters large;" to produce a body "truly circular, with as short legs as possible, upon the plain principle that the value lies in the barrel and not in the legs," and to secure a "small head, small neck, and small bones." As few things escaped his acute eye, he remarked that quick fattening depended much upon amiability of disposition, and he brought his bulls by gentleness to be as docile as dogs. In sheep his 'object was mutton, not wool, disregarding mere size," a vulgar test of merit. Dr. Parkinson told Paley that Bakewell had the power of fattening his sheep in whatever part of the body he chose, directing it to shoulder, leg, or neck, as he thought proper, and this, continued Parkinson, "is the great *problem* of his art." "It's a lie, sir," replied Paley, "and that's the *solution* of it." The account of Parkinson was, indeed, a mistake as to the mode by which Bakewell produced his fat stock, but it was no exaggeration as to the result.*

The great physiologist, John Hunter, confirmed in one essential particular the observations of Bakewell, for he asserted that in the human subjects he had examined he found small bones a usual concomitant of corpulence. Mr. Clive, the celebrated surgeon, who paid much attention to the breeding of cattle, also came to the conclusion that extremely large bones indicated a defect in the organs of nutrition. But "fine-boned" animals were in fashion when Bakewell commenced his career, and to the majority of people it seemed a step backwards to prefer well-made dwarfs to uncouth giants. One or two enlightened persons having suggested at Ipswick fair that a piece of plate should be presented to Arthur Young for the public service he had rendered in introducing the Southdown Sheep into Suffolk, a farmer determined to put forth the counter-proposition, "that he was an enemy to the county for endeavoring to change the best breed in England for a race of *rats*" The tenantry of that period were strong in the self-confidence of ignorance. "To attempt to reason with such fellows," said Young of some of those he met with in his tours, "is an absurdity," and he longed to seize a hedge-stake in order to break it about their backs. Even if they were persuaded to try some improvement to which they were not previously inclined, they reported that "their experience" was

* Archbishop Whately has adduced Bakewell's discovery to illustrate a position in his treatise on "Logic," and he puts in such a clear light one portion of the great cattle-breeder's mode of proceeding, that we quote the passage: "He observed in a great number of individual beasts a tendency to fatten readily; and in a great number of others the absence of this constitution: in every individual of the former he observed a certain peculiar make, though they differed widely in size, colour, etc. Those of the latter description differed no less in various points, but agreed in being of a different make from the others: these facts were his data. . . . . His principal merit consisted in making the observations, and in so combining them as to abstract from each of a multitude of cases, differing widely in many respects, the circumstances in which they all agreed."

unfavourable to it—their experience being in reality the forgone conclusion which was antecedent to experience, and which blinded them to the results of experience itself. The graziers who adhered to the old huge-skeleton race of stock were accustomed to give as the reason for their preference that a beast could not get fat unless there "was room to lay the fat on." It would have been just as rational to argue that none but farmers of large stature could have felt Young's proposed application of the hedge-stake, because in smaller men there would not be room to lay it on. Numbers of short, round, tub-like agriculturists, who uttered the current excuse for breeding bones in preference to flesh, were living representatives of the fallacy of their assertion. But there were others who were not slow to see the truth. A Southdown ram belonging to Arthur Young got by accident to a few Norfolk ewes of a neighbouring farmer. When the butcher came in the summer to select some lambs, he drew every one of the Southdown breed, which, he said, were by much the fattest in the flock. The owner instantly took the hint. Upon the whole the principles of Bakewell were more favourably received than most innovations in that day, and some of the pupils succeeded in improving upon the stock of the master. The brothers Collinges in Durham established the Durham or Teeswater breed, now known as the "Short-horn," which soon superseded the Long-horn, and every other kind where both flesh and milk were required. It is this which furnishes the true meat for the million; and it appears from the account of Mr. Robert Morgan, the great cattle salesman, who sells about 400 beasts a-week, that, while other favourite breeds are on the decline, this, with its crosses, has increased upwards of 10 per cent. Quartly successfully applied himself to improving the curly-coated North-Devon. Price took up the Hereford, and Ellman of Glynde the Southdown sheep, then little better than half-a-dozen other heathland kinds. The emulation gave rise to the forerunner of the modern fat cattle show, in single oxen of monstrous size, dragged round the country in vans, and with such success that in 1800 a Mr. Day refused £2000 for the Durham ox he had purchased two months previously for £250. Graziers who were not able to join the sheap-shearings of Holkham or Woburn, who did not read the agricultural works of Arthur Young, and would not have been convinced if they had, found their prejudices in favour of local breeds shaken by a personal interview with gigantic specimens of the Teeswater ox.

THE SPRING SHOW OF THE ROYAL DUBLIN SOCIETY.

The Annual Exhibition of this long established and important Society, was held in the last week of April, on the Society's premises, in Kildare Street. A glass and iron building of large extent, and possessing a pleasing architectural expression, is in the course of erection, and which, on this occasion, was so far advanced as to be partially used. It has been pronounced among the best Exhibitions of the Society. The *Mark Lane Express* observes:—"The short-horns came out very strong, and were beyond all praise,—134 yearling bulls. The beauty of the short-horn stock was the common talk." *Lamp of Lathian*, a remarkably beautiful yearling short-horned bull, belonging to Mr. Douglass, of Athelstaneford, Scotland, obtained the first prize and gold medal, and was purchased, to be retained in Ireland, for 250 guineas! Another prize yearling of this breed, was hired for the season at 100 guineas. In the two year old section, the first plate, and the medal as the second best of all the prize bulls, was awarded to Mr. Christy's *Foundation*, a well-executed wood engraving of which, and also of a very fine two-year old short-horn heifer, are given

in the *Irish Farmer's Gazette*, a weekly agricultural paper of the first class. *Foundation* is described "as a bull of immense substance, wide and deep chest and carcass, good quarters, and altogether an animal which has never belied his first promise. His services for the season have been secured by the Marquis of Waterford for 100 guineas, with the option of purchasing at the end of the season for 200." The Herefords were poorly represented, as were the Ayrshire and Alderney breeds, and the Devons appear to have had nothing very remarkable. The show of Kerries is described as being uncommonly good and numerous. "It is to be hoped," says the *Gazette*, "that some Kerry Collings will yet arise to develope the peculiarities and otherwise improve this very nice breed. As pet villa cows, really good Kerries cannot be surpassed."

The sheep department is described as being extensive, and generally of good quality. Mr. Beale Brown exhibited a magnificent shearling ram, and pen of three hoggets rams, of the purest Cotswold blood. It is said that these sheep constitute a portion of the *Seventy Cotswolds*, with which Mr. Brown, as the breeder, has challenged the world for a thousand guineas to produce their match.

In pigs the Exhibition was numerous, and of superior quality. Three prize sows were sold for £50, and a prize boar for 10 guineas. The poultry department was unprecedently extensive and of superior quality; but the show of horses was considered inferior to previous Exhibitions.

In implements and machines the Exhibition was unprecedentedly rich and extensive; many of the principal makers, from different parts of the United Kingdom, having stands, well filled with their characteristic productions. Among the novelties may be instanced a newly invented self-acting *Corn-meter* for stables, by which the feeds can be regulated at pleasure, at from 6 to 16 measures per bushel, and the number of feeds abstracted registered from 1 to 200. Mr. Harper is the inventor, an Irish manufacturer.

Mr. Haywood, of Derby, England, exhibited his two and three horse portable steam engines with vertical cylinders. "We look (remarks the *Gazette*) upon these small power steam-engines as a desideratum in Ireland; they are capable of threshing, grinding corn, and driving chaff cutters, turnip shears, or pulpers, cake breakers, saw mills; and the steam may be turned off for preparing chaff, &c., for feeding. We have examined them closely, and to our judgment they are made of durable materials, in the best manner, and perfectly safe with ordinary care, and the price, not more than that of a pair of good horses, is within the compass of most farmers holding from 50 to 100 acres, they are easily drawn about by a small poney, and may be stored away when not in use in any ordinary shed. The fuel used was Irish turf, and that of not a very good quality, which raised the steam just as well and rapidly as coal, a further proof of their being available in the interior of the country. With the exception of the last London Smithfield Show, this is the first time they have been exhibited at any agricultural exhibition." Machines of a similar kind, cheap, portable, and not easily put out of order, are well suited to the wants of our better class of farmers in the older settled districts of Canada.

JUVENILE HORTICULTURAL SOCIETY.

We learn, with much pleasure, that a Juvenile Horticultural Society has been organized at Berlin, C. W., with every prospect of success.

"Mr. A. Young, (observes the *Telegraph*), a lover of improvement in the cultivation of plants and flowers, has been instrumental in forming the above

named society, and has kindly consented to superintend it. The object of the society is to create and encourage a taste for Horticulture in its various branches. Mr. Young deserves great credit for his exertions in organizing this society which must prove of great advantage to the rising generation. We hope the parents and others will do all in their power to aid him in forwarding so laudable an undertaking."

This is a most praiseworthy example, to which we wish every success, and hope to see it followed in many parts of the Province. In all the older settled portions of the country Horticulture should begin to receive special attention. It is a most interesting and valuable pursuit, the natural ally of agriculture; they mutually illustrate and assist each other. The culture of flowers falls peculiarly within woman's province, and we shall be happy to be assured that our fair readers are generally interesting themselves in so beautiful and refining a pursuit. Who that has ever seen the cottage-homes of England, with their bowers of honey-suckles, roses, &c., and small patches of tastefully-arranged and carefully-cultivated flowers, but must desire to witness the reproduction of such refining and attractive objects in this country. A taste for these things is, like order and cleanliness, closely allied to the higher moral virtues, and may be ranked among the safeguards of domestic purity and contentment. While the cultivation of fruits and vegetables occupies a position of high economic importance in all civilised communities, and ministers largely to the comfort, health, and happiness of mankind. Let the spirit which animates our young friends in Berlin only become general,—a result to which all true education should tend,—and instead of a few Horticultural Societies, indifferently supported in a few of our larger towns, such organizations would shortly cover all the older settled portions of the Province, and exercise a powerful influence in refining the taste, and in adding to the solid comforts and material happiness of all classes of the community.

CANADA—ITS PRODUCTIONS AND RESOURCES.

The Journal of the Society of Arts, England, contains a very interesting paper read at a meeting of the Society on 12th May, 1858, by Professor Jno. Wilson, F. R. S. E., "On Canada, its productions and resources." Although much of the information contained in the paper, will not be new to many of our readers, still, as it is always more or less interesting to hear what is said of our country at a distance, and as information promulgated by so important an institution as the Society of Arts will exercise great influence in England, we copy a considerable portion of the paper and of the discussion upon it. We may add that Professor Wilson has shown himself a warm and active friend of Canada in connection with the display of her products at the great Exhibitions at London, Paris and New York, and on various other occasions. The learned Professor commences with a hasty sketch of the early political history and settlement of the Province, of its geology and physical geography, and of its mineral wealth. He then continues:—

This slight sketch of the mineral produce of the country, so far as at present explored, is, or ought to be, sufficient to show what immense resources can be offered to industrial enterprise when agriculture has occupied her surface and pioneered the way, and few countries can offer more temptation to the occupier of the soil. Although Canada has been denuded of all those secondary and tertiary formations which give such interest to the geology of our own country, the older rocks, which we are accustomed to associate with ideas of a thin, cheerless, and unfertile surface, have been largely covered up by post-tertiary, the most recent of our terrestrial deposits. Here we have both the chemical and physical elements of fertility, and happily these are spread over extensive areas throughort the Province. The greater portion of the surface of the country is occupied by the inter-stratified clays and sands of these deposits, giving, according to their relative admixtures, every variety of texture, and forming soils of great fertility, especially when in contact with the outcrops of the limestones and feldspars of the subjacent rocks. In this formation those beds of peat are met with, which, in the absence of coals, and with the decreasing supplies of wood, are already becoming of importance to the district in which they occur.

You have only to run your eye over the map of Canada, and you will see the admirable disposition of land and water throughout the entire extent of the country; the magnificent St. Lawrence, the backbone of the system, with its head waters in Lake Superior, and its other extremity in the broad Atlantic, 2,000 miles off, is the main link in the chain of Canada's present and future prosperity. Along the waters of this grand river, every district of Canada, aye, and of the mighty "West" too, finds a high road to the ocean—there free to take its produce to the markets that pay the best. Its tributaries, some hardly inferior in importance to itself, stretch right and left into regions where the woodman's axe alone breaks the solitude of the primæval forest, and connect the lakes and rivers of the interior with the ocean—and with those better kaown to us, on whose shores man has fixed his abode. Look at the Saguenay, with a tidal range of 10 feet to a distance of 80 miles from its mouth; the St. Maurice, with a length of some 300 miles; the Richelieu—connecting Lake Champlain with the St. Lawrence; the Ottawa, or Grand River—a river destined to occupy an important page in the future of the country—not only as a rival highway for the commerce of the west, but as possessing on its banks the newly-chosen Capital of Canada.

The enormous fresh water lakes or inland seas are too well known to need more than a passing notice. The first we come to, 756 miles from the sea and 234 feet above its level, is Lake Ontario, 180 miles long and 50 miles wide, with a depth of 100 fathoms, and having a surface area of nearly 6,600 square miles. Then comes Lake Erie, 1,041 miles from the sea, and 564 feet above its level, the difference in level being overcome by the Welland Canal, one of the finest specimens of canal engineering in the world. Here we have an expanse of water 240 miles long by 54 miles broad, covering an area of nearly 12,000 square miles. Crossing the small Lake St. Clair, 24 miles long by the same in breath, we reach Lake Huron, 240 miles long by 90 miles broad, with a surface area of about 18,000 square miles, at a distance of 1,350 miles from the sea, and 573 feet above its level. We now approach Lake Superior, the head waters of the St. Lawrence—a short but stupendous canal, constructed by the United States, connecting the two lakes, and completing the chain of navigation for sea-going vessels 2,000 miles into the interior of the country. The vast expanse of water of this lake, the largest in the world, with a length of 333 miles by 160 miles broad, giving a surface area of 32,000 square miles, is at present the end of the St. Lawrence navigation; but a glance at the map will show you that there are chains of rivers and lakes stretching far out into the north-west which some day will play the same part as those already named have done in the advancement of civilisation, and be made subservient to the purposes of man's welfare.

This bountiful distribution of water, and beautifully developed river system, has a broad bearing not only on the general welfare, but upon the very existence of the country. The great and ready powers of transport it affords are as nothing compared with its influence over the climate, the vegetation, and the health of the country. In these we recognise the bounteous provision which gives to the inland portions of the country almost an insular climate, and softens down those extremes of temperature which form such permanent barriers to the occupation of the "mighty West."

The two points most affecting climate and vegetation are temperature and rainfall. Let us see what the meteorological records of Her Majesty's Observatory at Toronto tells

us. We have a digest of the range of the thermometer for 11 years, from 1840 to 1850 inclusive :—

	Max.	Min.	Range.	Mean.
January	45.33°	4.41°	49.74°	24.67°
February	46.35	4.37	50.72	24.14
March	53.31	7.59	45.92	30.83
April	71.44	17.96	53.48	42.17
May	76.76	28.82	47.94	51.84
June	76.44	35.72	40.72	61.42
July	88.11	44.05	44.06	66.54
August	83.98	45.02	38.95	65.76
September	80.19	32.07	48.12	57.11
October	66.10	22.17	44.30	44.50
November	57.03	13.38	43.60	36.57
December	45.25	3.52	46.27	27.18

Annual Mean, 44.39°

These data show us that February is the coldest, and July the hottest month in the year; that there are four months—December, January, February, and March—when the average temperature is below 32°; there are three months—April, October, and November—during which the temperature remains below the mean temperature of the year; and that there are five months—May, June, July, August, and September—when the temperature is above the annual mean, and which constitute the growing season in Canada.

The average rainfall, calculated from the records of a series of years, gives the following results:—

	Days.	Inches.
January	4.6	1.701
February	3.9	1.088
March	5.7	1.613
April	8.7	2.571
May	10.3	2.975
June	10.7	3.042
July	8.9	3.720
August	9.3	2.719
September	10.6	4.458
October	11.2	2.929
November	9.2	3.026
December	5.1	1.522

Thus showing an average rainfall of 31.364 inches occurring on 97.3 days, and distributed nearly equally over the agricultural year.

To this must be added the average snow-fall, which amounts to 61.9 inches per annum. If we compare the extremes of temperature (taking summer and winter means,) between Toronto and the Western States of the Union, we find them entirely in favour of Canada.

	Latitude. Deg.	Min.		Deg.
Canada, at Toronto	43	39	the difference is	39·
Iowa, Muscatine	41	30	"	45·
Illinois, Fort Armstrong	41	28	"	49·05
Wisconsin, Fort Crawford	43	03	"	50·89
Missouri, Council Bluffs	41	45	"	51.34
Minnesota, Fort Snelling	44	53	"	56·60

If we compare the temperature and rainfall with those of this country, we find eth equally favourable results, our mean temperature being about 50° and our average rainfall about 28 inches, occurring on 155 days, showing a slight difference in favour of Canada.

As a proof that this excess, so important to vegetation, is not so high as to be injurious to health, the vital statistics of the province, compared with those of other countries, givesatisfactory evidence.

In Turkey,	the deaths	are	to	the	population	as 1 in 30
" Prussia	"	"	"		1	" 39
" Portugal	"	"	"		1	" 40
" Spain	"	"	"		1	" 40
" Switzerland	"	"	"		1	" 40
" Austria	"	"	"		1	" 40
" Norway and Sweden		"	"		1	" 41
" France	"	"	"		1	" 42
" Belgium	"	"	"		1	" 43
" Russia (Europe)	"	"	"		1	" 44
" Denmark	"	"	"		1	" 45
" England	"	"	"		1	" 46
" United States	"	"	"		1	" 74
" Canada	"	"	"		1	" 98
" " (Upper)	"	"	"		1	" 102
" " (Lower)	"	"	"		1	" 92

These remarks refer chiefly to Canada West, the meteorology of Canada East not having received the same attention. We know, however, that the extremes of summer and winter temperature are greater in the valleys of the St. Lawrence and Ottawa than south of the 44 deg. parallel; that though the winter is somewhat longer, the air is clear, dry, and bracing. The snow usually comes on at the beginning of December, and disappears about the middle of April, remaining on the ground three or four weeks longer than in the western part of the province. The snow-fall is looked for with great anxiety, especially in the thinly-settled districts, as it furnishes a natural railroad for transport and traffic, which, in a new country, where roads are necessarily few and imperfect, is of great importance. As the country becomes cleared and inhabited, the snowfall gradually diminishes, thus appearing to obey the laws of civilization, subserving to the wants of the settler in the early days of his necessities, and urging him to other resources as his age advances and his powers increase.

After giving some general statistics of productions, population, &c., the Professor proceeds:

"If we take the present productive returns of the cultivated lands as a basis for our calculation, it would be seen that the already occupied land in the colony would support a population of about 10,000,000 inhabitants, and if the present progressive rate of increase is sustained, a writer in "Hunt's Merchant's Magazine" tells us, that at the close of the present century we may expect to see Canada occupied by a population something like 20,000,000 in number. Whatever her numbers may be, it is quite certain that for years to come the great strength of the country will lie in the productions of her soil. With these she will pay for our manufactures; her surplus will supply our wants, and our surplus will administer to her necessities and comforts, and thus the scales of commercial benefit be kept pretty evenly balanced."

Social Condition, &c.

It is quite clear, I think, that there is ample space in Canada for a largely increased population, and it is equally clear, if we may judge from the past, that every increase is followed by a generally increased prosperity. To induce this by means of immigration, the government have lately offered free grants of land along three great arterial lines of road, which have been recently opened up and laid out for settlement. (These you will see marked on the map lying between the Ottawa and Lake Huron.) The grants are not to exceed 100 acres to each, and are offered on the following terms:—[The terms of settlement having been pretty generally published, we need not here repeat them.]

These lands are generally of very excellent quality, and well-adapted, in respect to soil and climate, to all the purposes of husbandry.

Australia excepted, no country can furnish such singular instances of the rise in the value of surveyed lands as the last five years have witnessed in Canada. The development of the railway system throughout the Province has been the principal agency by which this has been effected. When we recollect that 1852 saw Canada without a single railway, and that 1857 saw her with 1,500 miles completed, and 500 miles more in process of construction, the rise in the value of land is readily understood. The lines of railway must be looked upon as a series of accessible markets for the country they serve. The natural consequence is, that every product of the farm has acquired a certain money value, although before this new access to market it may have been absolutely valueless. The immense remuneration thus obtained for the same outlay of labour has greatly enhanced the value of capital. Land in old settlements, remote from lake ports, has doubled itself in value in five years; while wild lands in new settlements, near to which a railway passes, have trebled their value within a shorter period. These all-powerful means of communication have opened up the country, made available a vast amount of inert wealth, stimulated industry, and effected a complete revolution in farming economy within a range of twenty miles on either side of the course they take.

In all countries similar results have followed the introduction of railways, but in Canada, where lakes having formed the chief means of intercommunication, which were closed to all traffic during the winter months, the results are naturally more felt and more strongly marked. If we turn to the map we see the numerous lines already intersecting the centres of industry and population, while the Great Western Railway, running from Niagara to Detroit River—some 230 miles—and the Grand Trunk line stretching from Lake Huron in the west, down to Trois Pistoles on the east, connect all these lines with each other, and also with the seaports both of St. Lawrence and the open Atlantic. This gigantic undertaking, rivalling in its magnificence the great river system of North America, already has 849 miles in traffic operation. Its length, when complete, will be 1,112, and it will stand first among the railways of the world, not only on account of its exceeding length, but more especially for that triumph of engineering skill, which will carry the line of rails across the broad and rapid St. Lawrence, by a tubular bridge, of stupendous proportions, and nearly two miles in length. This (which is to be called the Victoria Bridge) will be complete and open for traffic in 1860; fourteen piers out of the twenty-four are finished, and it is expected that eight or nine of the tubes will be in their places by the end of the current year. The expenditure, so far, has amounted to £712,192, out of £1,250,000, the contract price.

Whatever may be the results of these railways as mere objects of investment, whether at first they are remunerative or not, this much is beyond question, that the extent and nature of the benefits they confer on the districts which they serve cannot be too highly estimated. The Railway policy of Canada has been successful, from its boldness and completeness—it has had all the advantages of home experience and home capital; home interests are largely mized up with its success—and one of the best ways to ensure that, is to make known, far and wide, the advantages it offers to those who are about to seek a new home in the fertile lands of the Western world. I regret that my time will not allow me to give you any details of the admirable arrangements by which the traveller or the emigrant is conveyed for *one payment* from the principal ports of this country, or, indeed, of Europe, to the confines of Canada, and farther still, the extreme boundaries of the United States—Kansas, Nebraska, or Texas; neither can I do more than give a very slight sketch of the great water highway, along which a vessel, sailing from Lake Michigan, finds its way to the broad Atlantic, and, in due time, hands over to the merchant at Liverpool the goods that were shipped at Milwaukie or Chicago. The natural difficulties of the great water roads of the country have submitted to the skill of man, and the canals, both proper and subsidiary, justly rank among the most successful evidences of Canadian enterprise.

The greatly increasing land traffic developed by the railways is urging forward a demand for increased facilities by water, to supplement either their area of service or their carrying powers. Already we find (by last half-yearly Report of the Grand Trunk Railway) a line of screw steamers of large tonnage preparing to run from the Michigan ports to Collingwood—the Northern Railway terminus, on Lake Huron—while at South Quebec, the principal terminus of the Grand Trunk Railway, a very important undertaking, of considerable magnitude, is already in active progress, under the title of the "St. Lawrence Dock and Wharfage Company," which will go far towards making Quebec the Liverpool of the North American continent. To this point of the river the

largest sea-going vessels can come, and now find a safe and commodious harbour, with every arrangement for their traffic purposes; and from this point a daily service of screw steamers of lighter draught will start, and deliver or collect cargoes for them from the river, or lake ports of the interior, while another line will keep Quebec in direct communication with the Lower Provinces on the Gulf. This, too, from the great facilities offered, will probably be the station of departure and arrival of the trans-Atlantic steamers, of which three distinct lines already connect the two countries together. These steamers are thronged even now with American travellers,* and when the communication with the Western States is fully opened up, we may easily imagine what the effect will be.

Mr. Wilson alludes briefly to the cities of Canada, and particularly Ottawa, the new capital, and proceeds:—

Between the shores of the Ottawa and Lake Huron lies a territory rich to profusion in mineral wealth, and vast forests which will afford for many years to come the source of profitable employment to the hardy labourer. As fast as the axe of the woodman levels the forest, the plough of the agricultural emigrant will turn up the soil, and rich harvests will be won for the supply of the extensive markets of the old and new worlds. But beyond this tract of timber and mineral lands, through which must shortly flow the waters of the Huron to mingle with those of the Ottawa, lie other lands yet unexplored, and unsubdued to the wants of civilization.

Across the inland sea of the Huron there are the Red River settlements, the very garden of the Hudson's Bay territory, over which monopoly and exclusion have so long thrown a veil of mystery,—but, from which, despite all restriction, there reach us rumours of rich and fertile lands, of abundant harvests, and of exhaustless wealth in the waters, the forests, and the mines. Still westward lies a vast tract of territory, the solitudes of which have been rarely disturbed, save by the trapper or the Indian hunters in pursuit of the wild animals for their furs. Century after century has passed over the regions watered by the noble Saskatchewan; the natural produce of the soil has decayed upon it year after year—the leaves of the dark forests have fallen in hundreds of succeeding autumns, and have enriched the plains to an extent with which even the most highly cultivated lands of old countries can bear no comparison. Nature has given not only a fruitful soil but a genial climate to these regions, and magnificent crops of golden grain of all kinds must reward the exertions of those pioneers of civilization, who, at no very distant day will awaken the slumbering echoes of this hitherto sealed land.

That this description is not overdrawn, Mr. Hind's recent Report† to the Government bears testimony. He tells us that the area of cultivable land of the first quality in the valley of the Red River, and its affluent, the Assinniboine, within British territory exceeds 1,200,000 acres, and that the land adapted for grazing in the same valley exceeds 3,000,000 acres; that all crops cultivated in Canada succeed well, and often show a yield far in advance of Canadian returns; and that the climate, which is a few degrees more extreme than at Toronto, is well adapted for all the operations of husbandry. Sir W. Logan, too, tells us of the favourable geological features of the Ottawa and Lake Huron district, while in the reports of his able assistant, Mr. Murray, we find tracts of hard wood lands, sure indications of agricultural fertility, being met with throughout the entire country.

It is in this region that the government allot the free grants of lands, which certainly offer great natural advantages to the hardy settler.

The report of another of Sir W. Logan's staff, Mr. Richardson has called public, attention to Anticosti, an island in the Gulf at the mouth of the St. Lawrence river. This large island, 135 miles long by 35 to 40 miles in its widest parts, and containing about 1,500,000 acres, is up to the present time totally unoccupied,—its only inhabitants, few in number, being engaged in attending the lighthouses and in hunting pursuits. This state of things will not long remain, as, thanks to the Geological Survey, we now know that the surface of the island is admirably suited to agricultural purposes. "The

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* Quebec to Liverpool.....2,500 miles.
Portland to Liverpool.....2,750 "
Boston to Liverpool.....2,790 "
New York to Liverpool.....2,980 "

† Report of the Canadian Red River Exploring Expedition, dated Feb. 22, 1858.

easily disintegrating character of the rocks forming the subsoil can scarcely fail to have permitted a great admixture of their ruins with whatever drift may have been brought to constitute a soil, and it is reasonable to suppose that the mineral character of these argillaceous limestones must have given to those *debris* a fertile character. It is precisely on such rocks, in such a position, and with such an attitude, that the best soils of the west peninsular of Western Canada, as well as those of the Genesee country, in the State of New York, are placed. I have seen nothing in the actual soil," says Mr. Richardson, "to induce me to suppose that, in so far as soil is concerned, Anticosti will be anything inferior to those regions, and considerations of climate only can induce the opinion that it would be in any way inferior to them in agricultural capabilities. The three months that I was on the island were altogether too short a time to enable me to form any opinion upon the climate of Anticosti. But taking into view the known fact that large bodies of water are more equable in their temperature than large surfaces of land, I should be inclinedto suppose that Anticosti would not be so cold in winter, nor hot in summer, as districts that are more inland and more south, and that it would not compare unfavourably with any district between it and Quebec. While the autumn frosts would take effect later at Anticosti, the spring would probably be a little earlier at Quebec. But such is the condition of the island at present, that not a yard of soil has been turned up by a permanent settler, and it is the case that about a million of acres of good land, at the very entrance from the ocean to the province, are left to lie waste, while great expenses are incurred to carry settlers to the most distant parts of the west."

Another important settling country of great prospects, lying between Quebec and the Gulf, has been discovered by Sir W. Logan, the details of which will be given in his next report to the Provincial Government. In a recent letter he says:—"Last summer one of my exploring parties visited the valley of Lake St. John, on the Saguenay. After passing the gneiss rocks, which give such grandeur to the scenery of the Lower Saguenay, and such a forbidding agricultural aspect to the land for a breadth of 50 miles, this party were very much surprised to find themselves in a valley, which, though 2 deg. north of Quebec, has a climate mild enough to ripen Indian corn and grow excellent wheat, and, in fact, to produce all that is produced between Montreal and Kingston. They went forward into this valley to the westward for 75 miles; it had then a breadth of 50 miles, and the boundaries of it on each side appeared to run on far enough to give 30 miles more in length, so that we may say 5,000 square miles of a good settling country were visible. The soil was generally argillaceous, and the entire valley appeared to be underlaid by lime-feldspar. Settlement is gradually extending into it, and the inhabitants are very prosperous."

Let me now briefly recapitulate the amount of accommodation which Canada offers to new settlers, and you will have a good idea of the enormous resources of the country. Her present population is about 2,500,000, while her lands already occupied are equal to the support of a population of 10 millions. Then we have Anticosti, with its million of fertile acres; the St. John's Lake Valley, where upwards of 3,000,000 acres have already been made known; and, lastly, the important districts lying between the Ottawa and Lake Huron, where government allotments are now being made. Beyond these, the vast territories of the N. W. stretch out their arms wide enough to receive the surplus population of the old world for well-nigh all time to come.

The paper concludes by noticing the efforts made by the Minister of Agriculture in Canada to attract a valuable class of immigrants to the Province, and pointing out summarily the inducements to such an immigration.

Discussion.

The Chairman asked Professor Wilson whether he could give them any information about a celebrated fish of Lake Superior, "the siskawit," alluded to by Mr. Simmonds, in a paper in the third volume of the Society's *Journal*, page 40. He would read the following passage referring to it:—

"The siskawit, a fish of Lake Superior, is reported to be the fattest fish that swims either in fresh or salt water. The fishermen say that one of these fish, when hung by the tail in the hot sun of a summer's day will melt and entirely disappear except the bones. In packing about fifty barrels last season at Isle Royale, one of the fishermen made two and a half barrels of oil from the heads and leaf fat alone, without the least

injury to the marketableness of the fish. Besides this leaf fat the fat or oil is disseminated in a layer of fat and a layer of lean throughout the fish. They are too fat to be eaten fresh, and are put up for market like the Lake white fish and Mackinac trout—celebrated American delicacies."

Mr. P. L. Simmonds said, that the extract just read formed part of a paper "On some Undeveloped and Unappreciated Articles of Raw Produce from different parts of the World," which he had read before the members at the close of 1854, and for which the Society had done him the honour to award him their silver medal. It was part of a passage in which he was directing public attention to the neglected river and lake fisheries of North America, and it was known as a peculiarity of the fish of the American inland seas that they were very fat.

Before Professor Wilson replied to the Chairman's question, he (Mr. Simmonds) craved permission to make a few remarks on the very excellent paper which had just been read—a paper which, from its valuable statistics and succinct details, was calculated to do much good, not only for the promotion of colonial interests, but also in diffusing sound and authentic information at home. Unfortunately, a great deal of ignorance still prevailed among many classes in the United Kingdon respecting this, our nearest and most important emigration field. Relatively with our other possessions, Canada was making gigantic strides in progress and prosperity. He saw present his friend Sir Cusack Roney, who, from his official position and practical experience, would no doubt be able to afford much valuable recent information connected with emigration and railroad operations. And as respected railways, Professor Wilson had rather understated the number of miles open, there being now 1,653 miles in working operation. It was satisfactory to mark the present condition of Canada and its improving prospects, which were mainly owing to its extensive land and water communications, which had been so fully described. But there were other causes at work. The Americans and the British settlers were now amicably trading together on mutually advantageous terms under the Reciprocity Treaty. There were now no boundary quarrels, no fishery disputes, no hostile frontier warfare, but a beneficial through traffic was carried on up the St. Lawrence and the lakes to Chicago, and the Western States, and through Portland over the Grand Trunk Line to Canada. But Canada should be viewed not only in its isolated character, but in the relation it was likely to bear, and the influence it would exert in a Federative Union of the British North American Colonies, which would sooner or later take place, even as the union of the Australian Colonies was now being discussed by the several local legislatures. Canada, as had been well remarked, had wisely directed her chief attention to the development of her agricultural resources. These were not only the mainstay, but the sure earnest of success for a young colony. Minerals she had in abundance, the gold of the Chaudiere, the crystalline iron on the islands in Lake Nipissing, the marbles of the Belleville district, the beautiful lithographic stone extending over a tract of seventy miles, from Marmora to Lake Simcoe, the phosphate of lime in the Ottawa valley and elsewhere, and the prolific copper mines on the Canadian shores of Lake Superiar, where one mass of virgin copper, weighing 160,000 lbs., had been discovered. But the period has not yet arrived for the due development of these. Labour, capital, and manufacturing works on a large scale were yet deficient. Unlike Australia, where agriculture had given place too much to mining, which partook of a speculative and gambling character, Canada had wisely looked to the products of the farm and the forest, and these furnished the staples of her prosperity. Last year we had imported 115,000 quarters of wheat from British North America. The latest returns of exports given by Professor Wilson (those for 1856,) showed that the total value, adding the exports to the inland ports, amounted to about £8,000,000, averaging nearly £4 per head of the population. And the value of the imports, which, for 1856, was given at £11,000,000, was last year still larger. Much of this was, however, taken out by emigrants. Neither could the materials for constructive works, imported from England, be fairly apportioned to the population. Emigration, which had been rather slack for the two previous years, owing to the demands for enlistment during the war, was last year more active, about 21,000 souls having proceeded to the North American colonies, being an increase of between 4,000 and 5,000 over the preceding years. Most of these, as the Chairman was aware, proceeded to Canada, and although some few passed on to the States, yet the largest portion settled in the colony, and there was even an immigration from the States and Lower Provinces. What Canada was at present they had heard in the paper just read, but what she was likely to be in a few years it

was difficult to tell. Looking at the extraordinary advances that had been made since 1851, in another five or six years, with improved Atlantic and internal communication —with the probable link of the submarine telegraph across the ocean—and with free grants of land, and the extended territory opened up in the Red River district, and the Ottawa valley, and the Saguenay, we should, probably, find another million added to the population. According to the report of the Commission on Crown Lands, for 1856, the total number of acres of surveyed land unsold remaining in Canada, was 6,732,220, and of unsurveyed, 168,845,455, which, added to private lands undisposed of, make a total in that part of Canada drained by the St. Lawrence and its tributaries, conjectured at 212,019,200 acres. Of this quantity, there were, in Western Canada, 830,398 surveyed, and 57,770,416 unsurveyed, and in Eastern Canada, 4,797,550 surveyed, and 112,075,039 unsurveyed. The direct trade with Canada had a large effect on shipping interests. Professor Wilson had alluded to the shipbuilding of Quebec, but there was a large amount of tonnage locally owned and employed in the Province. In 1856, 2,972 ships, registering 230,000 tons, and 1,143 steamers, registering 119,500 tons, passed up the St. Lawrence Canals. There were in the Canadian Lakes about 230 vessels, averaging 176 tons, exclusive of small craft, and these ships were valued at half a million sterling. The timber trade with Quebec, as was well khown, employed a large amount of tonnage, about 140 vessels, but the general entries of shipping from the British American Colonies last year, amounted to 2,452 ships, aggregating 1,141,476 tons. Of these, the largest number came from the St. Lawrence. When we perceived what strides the various towns and districts of Canada had made, that its colonial revenues were healthy, and its public works on a gigantic scale as compared with other British possessions— when we saw that the import trade of Montreal had doubled itself in the last ten years, and that the provincial authorities were using their utmost exertions to advance the interests of the colony at home and abroad, there could be little doubt that, all things considered, it offered a desirable home for thousands of the handy and industrious population of the United Kingdom, especially the agriculturists and artizans.

Sir Cusack Roney said he, in common with all present, had listened with great interest and pleasure to the paper that had been read, which contained a mass of information of the most valuable and truthful character, brought down to the latest period. With regard to the fisheries alluded to, he would state that, in the upper lakes, namely, Lakes Superior, Michigan, Huron, and Erie, very extensive fisheries were carried on. In 1856, there were from 80,000 to 100,000 barrels of fish caught, principally by Americans, and not by Canadians, which fish was salted and cured in the district, and formed a very considerable item of trade there. A very large quantity of the fish of the upper lakes was also used in a fresh state, and Detroit especially, one of the largest towns on the lakes, situated at the foot of the Lake St. Clair, consumed large quantities of it. The fisheries of the lower St. Lawrence, too, thanks to an Act passed in 1856, by the Canadian Legislature, would receive an amount of protection which they had not hitherto had. There had been for many years a vast destruction of the young fish, and great carelessness with regard to them; but now that the Act was passed for the proper protection of the fisheries, there would be an abundant supyly of salmon, and by the employment of steam tugs on the St. Lawrence the fish was brought up to Quebec, and from thence it was conveyed by railway to Boston and New York, and other large cities of the United States on the eastern seaboard. The fish fetched very high prices. The Canadian Government, he was happy to say, had of late paid a good deal of attention to the fisheries of the Gulf of St. Lawrence, and had established a system of lighthouses along the coast, and also fishing stations; and he hoped that in the course of a year or two that trade would be largely developed. Professor Wilson had stated that the imports into Canada in 1856 amounted to £10,000,000, whilst the exports in the same year were only of the value of about £8,000,000. Perhaps that might appear a circumstance rather unfavourable to Canada, but the fact was, that the imports of late had been very great in consequence of the construction of railways and other public works going on there. The iron, the locomotives, and almost every description of railway plant, had been imported, and as nearly nine-tenths of the revenues of the Canadian Government consisted of customs duties, those articles, like most others, had had to pay a heavy duty. The consumption of imported articles by the actual consuming population of Canada was below £10,000,000 in the year; but, nevertheless, it was very large, amounting to £3 to £4 per head per annum, showing that almost every person in the colony was in a position to use in abundance those articles which contributed to the revenue of the country. The exports to the United States had increased in a very large

measure, in his opinion very much owing to the Reciprocity Treaty, which was brought about by Lord Elgin in 1854. The development of trade between Canada and the United States had been very great in consequence, but he was sorry to add that the United States Government had recently imposed restrictions upon that trade which were likely to have an injurious effect upon Canada; but the mail which arrived the day previous brought the intelligence that Lord Napier, our ambassador at Washington, had been engaged in conferences on this subject with the American Government, which led to the hope that the restrictions to which he had alluded would either be removed or very considerably modified. In the comparison made by Professor Wilson between the State of Ohio and Canada there was one feature of very considerable importance, as showing the progress which Canada was making in a department of agriculture equally important to that for which the colony had hitherto been chiefly celebrated—viz., its production of wheat. He alluded to the quantity of cattle stock which they were acquiring. Ohio and Canada were in that respect about equal at the present time. In 1856, the number amounted to 900,000 head of cows and of cattle in each. In Ohio a great deal of attention was paid to the improvement of the breeds, and they had imported from this country some of our most valuable stock. It was, therefore, not to be imagined that henceforth Canada would enjoy celebrity as a wheat growing country only. They were paying great attention to other descriptions of agricultural production; and thanks to the influence of agricultural societies, which extended all over the province, and to which the government contributed liberally in the shape of prizes, they were beginning to recognise the value of the rotation of crops and those other improvements which were so important in a country like Canada. The subject of emigration had been alluded to in the paper, and, as that was a matter in which he had had some experience, he would take that opportunity to express a hope that persons unsuited for emigration to any new country would avoid going to Canada. Persons who were seeking employment as accountants, bookkeepers, clerks, and shopmen, in fact, all descriptions of persons accustomed to in-door occupations, were extremely undesirable emigrants, because they could not get employment except at a very unremunerative scale of payment. They could not compete with the native article in the new country. The younger members of families already resident there were taken into those employments, and they could afford to accept a lower rate of remuneration than those who had to support themselves entirely by their own industry. Emigrants from England seeking such employment generally failed to attain their end, and these were the people who sent home accounts discouraging emigration. Such persons had far better stay at home. Canada at present was no place for them; but to those accustomed to out-door occupations, such as farmers with small capital, labourers, and persons accustomed to use their hands and legs, to them profitable employment would be found in Canada at a rate of remuneration that was unknown in this country for that description of labour, and they might all hope to be successful if their conduct was good, and provided they were temperate. If a man were intemperate nothing could save him, for it seemed that intemperance—bad as it was everywhere—was even more destructive to human life in America than it was in this country. With regard to the great public works already executed and still progressing in Canada, he might be allowed to allude to that mighty structure, the Victoria Bridge. It would be the largest engineering work in the world. There were 24 spans with tubular girders, of the character shown in the drawings exhibited on each side of the room. These, with the exception of the centre one, were 240 feet wide. The centre span, which was intended to serve the purposes of navigation, was 330 feet wide, and there would be 60 feet between the water and the under surface of the tube. The piers were bevilled off for the purpose of allowing the ice to pass away at its breaking up in the spring, which in that country was a formidable occurrence indeed. Within the last four or five weeks, the ice was piled up to a height nearly equal to that of the under surface of the tubular girders, but notwithstanding its unusual accumulation this season, every pier stood as solid as the rock on which it was founded. This was important to notice, inasmuch as some of the fine masonry with which the quays along the river at Montreal were built was greatly damaged and torn up by the violence of the ice. He might mention a circumstance of some importance which had occurred that day, although he could not state it as a certain fact. It had been proposed that the *Leviathan* should run for a period of years in connection with the Grand Trunk Railway of Canada, and this would be the means of carrying out emigrants to that colony and the Western States of America with an amount of comfort and attention to the wants of those persons, such as had never been experienced up to the pre-

sent time. He believed the whole combination would be one that would be eminently successful. It was a curious coincidence that exactly 10,000 tons of iron were used in the construction of the *Leviathan*, and the same amount of iron would be required for the tubes of the Victoria Bridge. Allusion had been made to the progress of the electric telegraph system in Canada. He only wished that the progress made there would react a little in this country. In Canada a message of ten words, exclusive of the addresses of the sender and receiver, could be sent between Quebec and Montreal, a distance of 180 miles, for 6d., and a halfpenny for every additional word; whilst for the shortest message to Liverpool—200 miles—the charge was 4s. From Quebec to Hamilton, between 400 and 500 miles, the charge for ten words was only 1s. 6d.

Mr. G. F. Wilson, F.R.S., would say one word with reference to the latter portion of the paper, and the commentary of Sir Cusack Roney upon it. He (Mr. Wilson), in common with most other employers of labour, was often consulted by men who had saved a little money in this country, and who wished to benefit themselves and their families by emigration, but who did not see their way to do so. They were dissatisfied with their prospects at home, and they came to him for advice as to where they ought to go to. Up to the present time he had said that he believed Canada to be the right place. But this paper, he thought, gave the whole of the information that was required, and when it was remembered that it would be laid within a few days upon the tables of upwards of three hundred Mechanics' Institutions, and would be read by thousands of working men throughout the country, it was impossible to exaggerate its importance.

The Chairman said, considering that Canada was one of the finest dependencies of the crown, he thought they could not but feel indebted to Professor Wilson for placing before the public an account of the resources of that country. He was, therefore, sure that they would heartily unite with him in according their thanks to Professor Wilson for his very admirable paper.

The vote of thanks having been passed,

Professor Wilson begged to express his acknowledgments for the honour they had done him. With respect to the fisheries, those he had alluded to were not at the upper part of the St. Lawrence so much as at the lower part, and on the Gulf. He was sure that any one who was fond of salmon-fishing, and who had read the accounts which he had seen in reference to it, would not think of going to Norway, but would start at once for the St. Lawrence. In the Saguenay and the lower St. Lawrence, he believed the salmon fishing was of the very finest description. A paper on this subject had been written by his friend Dr. Adamson, of Quebec, which afforded valuable information to those who went out upon such an expedition; and there was also a communication by Mr. Nettle, confirming all that Dr. Adamson and others had written. But there were other fisheries of greater importance than the salmon. In the St. Lawrence—in the lower part of the river—the porpoise fishery was carried on, for the purpose of furnishing oil for the lighthouses, but he believed the extent to which it had been carried on was barely sufficient for the supply required by the contract, which had been entered into. In the Exhibition of 1851, a novel feature in the Canadian products was a species of leather prepared from the skin of the porpoise, for which the exhibitor, as an encouragement to pursue the matter, was rewarded with a medal, but he believed very little had been done with reference to it since.

Mr. Simmonds stated that it was to some extent an article of commerce in this country, and was used for shoe leather and for other purposes.

Professor Wilson added that he thought it was an article well worth attention. With regard to the salmon fisheries in that district, he was sure they would be carried out to a very large extent. He had tasted salmon in Scotland that had been sent from Vancouver's Island, and it was as fine flavoured as any he had ever eaten. With regard to the exports and imports of Canada, although the imports appeared to exceed the exports by about £2,000,000, yet this must not be considered an unfavorable symptom. He found, comparing the exports of 1856 with those of 1851, there was an increase of 150 per cent., whereas the imports had increased only 100 per cent., and at that rate the exports would soon equal the imports in amount.

Extraordinary Gold Nugget.—The largest and purest gold nugget yet discovered will be exhibited to public view at the Crystal Palace on the 1st of May. It weighs 1,743 oz. 8 dwts., and is of the computed value of £7,500; £10,000 was offered for it at Melbourne. It was found at a depth of 18 feet from the surface, in the Bendigo district, about 120 miles from Melbourne.—*English Paper.*

THE

Canadian Agriculturist,

AND

JOURNAL OF THE BOARD OF AGRICULTURE

OF UPPER CANADA.

VOL. IX. TORONTO, JUNE, 1858. No. 6.

HARVEST PROSPECTS.

The accounts, both public and private, which have reached us respecting the state of the crops are, as usual, somewhat conflicting. Information of this kind is often the result of very limited observation, and there is generally more or less a tendency in individual minds, as well as in the current of public opinion, to exaggerate either an evil or a good that may assume a characteristic form. Some accounts appear to assume that the wheat crop of Canada is generally promising, and at least an average; while others—and we are very sorry to say that these are by far the most numerous—would almost lead one to expect that our prospects are of the most gloomy description, and that the hopes of the husbandman are in a great measure doomed to disappointment. From all we can learn from a collation of numerous letters and reports, we are inclined to believe that the result will come out between these extremes, and nearer, we have reason to hope, the favourable point than the opposite. That our wheat crop will reach the full average of a number of years, is more than can be expected, when proper allowance is made for the positive injury that has already been too certainly ascertained to exist in a large number of localities, over a considerable area of the Province. The destructive effects of the midge are being most disastrously felt this season in various sections of the country, where this insiduous evil has hitherto been almost, if not entirely, unknown. Its progress westward is not only constant, but from late and present appearances, would seem to be more rapid than formerly. Much has been said and written upon this subject, which, notwithstanding, yet remains in a painful degree of obscurity; particularly in reference to practical preventives. However, investigations must be vigilantly pursued, deductions carefully drawn, and more light and control will assuredly be imparted in reference to this distructive pest. In our own columns we hope shortly to be able to insert additional information, derived from careful observations and extended experience, on this and other insects injurious to farm

crops. The rust, too, has been recently and rapidly developed to a very injurious extent in some localities. This will probably be found the case at a distance from the frontier; the midge being principally confined to the older townships. In some parts of the country, particularly in low and moist situations, wheat has suffered severely from rust, but we hope this evil has not spread over extensive areas. Spring grain is generally promising, and the hay crop in most sections has been abundant, and upon the whole secured in excellent condition. Potatoes and maize were much injured on wet lands by the unusual quantity of rain that fell during May and the early part of June. On dry well tilled lands potatoes are looking well, and we have not heard, as yet, any well authenticated instances of disease. Live stock, having in general a good supply of food, are doing well.

The accounts of the crops in the United States are, as might be expected, varied; but it is sufficiently obvious that the wheat has suffered in different parts of the union from similar causes which have affected the same crop on this side; and it is doubtful whether the usual average will be obtained. In Britain and the grain growing countries of Europe generally, the prospect, according to the last reports, continues highly encouraging. Much, of course, will depend upon the state of the weather during the month of August; if the skies prove propitious the yield in Europe will be large, and prices consequently moderate.

TRIAL OF MOWING AND REAPING MACHINES.

The practical trial of mowing machines intended for competition at the Provincial Exhibition this Autumn, took place on the 7th July, on the farm of Col. E. W. Thomson, Dundas street, near Toronto. There were 11 competitors and 14 machines entered. The following are the names of the competitors:

R. & R. S. Patterson, Belleville, combined machine.
Chauncey Yale, St. Catherines, one combined and one single machine.
Darling & Aitchinson, Vaughan, single machine.
Haggart & Bros., Brampton, single machine.
Ira S. Leflar, Streetsville, " "
Bell & Lawrason, St. George, " "
John Watson, Ayr, " "
Lutz, Cook & Co., Galt, combined "
H. A. Massey, Newcastle, two combined machines.
Billington & Forsyth, Dundas, single "
Patterson & Bros., Richmond Hill, one single and one combined machine.

Of these manufacturers all had their machines upon the ground except Messrs Bell & Lawrason, who were detained beyond the time by the railroad train; of the rest one or two, from their machinery getting out of order or some other cause, retired from the contest after coming upon the ground. The weather was very propitious for the occasion, and there was a large number of visitors, all of whom seemed to take the greatest interest in the exhibition. The first field in which the machines were set to work was of heavy clover and much

laid; so that it was difficult for the machines to operate well; but in the second field, in which the machines were tested by the dynamometer, the crop was well mixed with timothy and stood up well; and in this field all the machines tested performed as well as could be desired, rendering it, no doubt, rather a difficult matter for the judges to decide between them.

The trial of reaping machines took place on Thursday, 22nd July, on the property of P. Howland, Esq., Dundas street, near the Humber. The weather was very favourable, and the wheat in excellent condition for the trial, sufficiently heavy and generally standing well up, with an occasional laid spot to test how the machines could get over such places. The following named competitors appeared upon the ground:

John Watson, Ayr, single reaper.
Patterson, Bros., Richmond Hill, single reaper.
H. A. Massey, Newcastle, combined machine.
R. & R. S. Patterson, Belleville, combined machine.
Haggart & Bros., Brampton, single machine.
Bell & Lawrason, St. George, single machine.
Ira S. Leflar, Streetsville, single machine.
Johnson & Bros., Meadowvale, single machine,

The quantity cut by each machine was nearly 1¾ acres, and the time occupied from 35 to 61 minutes. The machines were afterwards tested singly by the dynamometer. The cutting of nearly all was highly satisfactory. There was, as at the mowing trial, a large number of interested spectators. The Judges at both trials were Messrs. Christie, Campbell, Bell, McKellar, McDougall, M. P. P.'s, and Messrs. John Dew and E. D. Norton, of Toronto, all of whom gave the fullest attention to the arduous task imposed upon them, so as to enable them to form a correct and impartial judgment. They are to give in their report at the Provincial Exhibition.

THE CRYSTAL PALACE.

The foundation stone of this building, now in course of erection on the garrison common, Toronto, for the use of the Provincial Exhibition this Autumn, was laid on the 15th July, by the Hon. Mr. Vankoughnet, Minister of Agriculture, assisted by E. W. Thomson, Esq., President of the Board of Agriculture, and W. B. Jarvis, Esq., President of the Board of Arts and Manufactures. There was a large concourse of spectators, including nearly all the members of both branches of the legislature. A report of the addresses on the occasion will appear in the *Transactions*.

The building is now in a forward state, and will be finished by the energetic contractors, Messrs. Smith, Burke & Co., some days before the time required by terms of the contract.

THOROUGH BRED CATTLE.

A correspondent requests us to give some information about the registering of the pedigrees of thorough bred cattle. It is one of the rules of the Provincial Association that no animal will be allowed to compete in the pure bred classes unless the pedigree be first satisfactorily established. A registry is kept in the office of the Board of Agriculture for the purpose of recording such pedigrees, with the view of publishing a Canadian Herd Book when the number registered shall be sufficient; and the duties of the officers of the association will be much facilitated at a juncture when there is a great pressure of work, and the economy of time is consequently important, viz: at the period of receiving entries for the exhibition, if persons intending to exhibit thorough bred animals send the pedigrees for registration at an early date. Pedigrees should be made out as fully, but at the same time as clearly and distinctly as possible, giving the name, age, and colour of the animal, the name and residence of the breeder, and then the breeding of the animal. Give first the name of the sire; if he is a herd book animal no further account of him is necessary than the figure of reference; if he is not a herd book animal, his pedigree must be clearly traced (and this will be more conveniently done in a foot note) back to the herd book on the side of both sire and dam; after the name of the sire give that of the dam and of her sire, then of the grand dam and her sire, and so on; always tracing back directly through the female side. There is no charge for registering, but if a certificate is desired a fee of half a dollar will be charged for each. The following example from "Coates' English Short Horned Herd Book," will serve those not already familiar with the subject, as a guide to the manner in which pedigrees should be made out:—

MASTER BUTTERFLY, [13311].

Roan, calved July 14th, 1853, bred by and the property of Mr. Towneley, Towneley Park, Burnley;
got by Frederick (11489),
dam (Butterfly) by Jeweller (10354),
g. dam (Buttercup) by Garrick (3863),
gr. g. dam (Barmpton Rose) by Expectation (1988),
gr. gr. g. dam by Belzoni (1709),
gr. gr. gr. g. dam by Comus (1861),
gr. gr. gr. gr. g. dam by Denton (198).

It must be understood distinctly that "Butterfly" is the dam of "Master Butterfly," and not of "Frederick" (11489), and that "Buttercup" is the dam of "Butterfly." Many persons commit the error of going from the name of the sire to that of his dam, instead of to that of the dam of the animal to be recorded. In cases where it is necessary to distinguish, the letter E. H. B. should be added to the figures of reference to denote the English Herd Book, A. H. B. the American Herd Book, and U. C. S. R. the Upper Canada Stock Register.

THE WHEAT FLY, MIDGE, &c.

The following communication on the subject of the Wheat Fly, has been forwarded to us by an esteemed contributor, with the view of having the suggestions contained in it, brought prominently before the attention of the farmers of Canada. We commend the subject most earnestly to the consideration of our readers, and that of all occupiers

of land. The suggestions below, if rigidly and universally acted upon, would perhaps not be so successful as to exterminate the fly entirely and at once, but there can hardly be a doubt, that they would be the means of checking its progress so far as to prevent it doing very material mischief, till in course of time, it should entirely disappear. It will be perceived that the writer agrees, in his practical suggestions, with the Rev. Mr. Hill, in his essay, concluded in the present issue:—

THE WHEAT FLY.

"Now is the time to destroy the midge, weevil and wheat fly, if we intend to prevent the devastation of this year increasing tenfold at the next harvest.

All those classes of wheat fly which attack the wheat in the ear, are now in the state of the worm and chrysalis, and are on the ground in the fields where the wheat was grown, and in the barns where the crop is housed.

Sift out the worms from the wheat as you thresh and clean it, and burn them with all the seeds.

Plough your wheat stubbles with the double American plough or with two ploughs following one another, so as effectually to bury all the stubble and the present surface of the soil.

You thus bury and destroy all the worms which are now on the ground; they have no legs and cannot get through more than an inch or two of soil.

The ground must not be ploughed again till next fall, but only cultivated on the surface, or you will bring the worms up again and they will come forth as flies.

Never mind losing the clover and grass which have been sown amongst the wheat. The clover and grass in the stubble field is the nursery of the next year's fly.

We recommend the above to the attention of all farmers, and also to Editors of all papers published in Canada."

Toronto, July 29th, 1958.

THE PROVINCIAL EXHIBITION—CIRCULAR.

To the Presidents and Directors of the respective Agricultural and Horticultural Societies, Mechanics' Institutes, and to the Public generally.

Gentlemen,—As the time for holding the Annual Provincial Exhibition at Toronto, on the 28th, 29th and 30th of September, and 1st of October, is now approaching, at the desire of our worthy President, D. B. Stevenson, Esquire, (whose present ill-health, I regret, prevents him from issuing the usual annual circular,) I beg leave respectfully to request your co-operation and assistance, in endeavouring to make the coming show, not only equally attractive and beneficial to the whole community with those of previous years, but also an honour to the people of Canada.

The steady progress of Agricultural Science, Arts and Manufactures, and the consequent improvement in the commerce of the country—although lately temporarily retarded—must be apparent to all; and it must also be pleasing to anticipate, through increased means placed at the disposal of the Board of Agriculture, that a further advancement in the welfare of the Province may be confidently looked for.

The continued prosperity of the Provincial Agricultural Association, does not depend so much for support upon its financial resources, as upon the cordial assistance of the various County Agricultural, Horticultural, and other Societies of like character; which support it has a right to expect, considering that the society was originally established for the promotion of the good cause in which they are all respectively engaged. It is, therefore, for the best interests of those societies and the public generally, that their united efforts should be employed in aiding the members of the Board of Agriculture to

carry out the contemplated and varied improvements for which they are zealously striving.

To the encouragement afforded by a liberal premium list, and to the past excellent management of the Board of Agriculture, may be ascribed, in a great measure, the success which has heretofore attended the working of the Agricultural Association; and it is our duty, as well as our interest, to encourage and assist by every means at our disposal all those who may be willing to contribute to the ensuing Exhibition at Toronto, such specimens of their industry, skill or art, either as competitors or exhibitors, as may have a tendency to promote the cause of Agriculture, Arts and Manufactures in all their varied branches, and the general interests of the country. And it is hoped that, on that occasion, that very interesting portion of the Exhibition containing the Ladies' Department and the Fine Arts, will, as usual, command the attraction and admiration of the tens of thousands of visitors that may be expected there.

In addition to the honors secured by successful competition, this year's increased premium list, as will be seen by examining the printed lists, now in circulation, offers greater inducements than any of previous years; particularly in the Mechanical and Manufacturing Departments, with the view to bringing those interests more prominently before the public.

As a proof of the success resulting from the encouragement afforded to Mechanical genius, it was gratifying to witness the achievement obtained in the improved Mowing and Reaping Implements, when testing their working powers as labor saving machines, at the recent trials which took place near Toronto. These trials, both in grass and grain, have proved most conclusively that the time is not far distant when these machines will be as necessary adjuncts to the farm, as that important implement, the plough, itself.

The difficulties in some instances heretofore experienced by exhibitors and others, through the want of waterproof buildings and suitable space in which to exhibit the finer articles of Manufactures, the productions of the Ladies' Handiwork, and the Fine Arts, &c., will happily be obviated at the coming show, as Toronto and its neighborhood, with an enterprize worthy of its people, have now in course of construction, and at a very considerable cost, a magnificent structure composed principally of iron and glass, to be perfectly waterproof, and suitable for all the requirements of that or any similar exhibition which may be holden there; so that those engaged in the finer branches of manufacture, or the more costly productions of art for the exhibition, have a perfect guarantee for security and protection to their articles. This edifice, when completed, which will be before the holding of the show—will not only be a credit to Toronto but the Province at large; and possess an attraction, from its novelty and beauty of structure, as well as its richly filled courts during the time of the Exhibition, rarely to be seen in this country.

As difficulty and much inconvenience in obtaining accommodation have been experienced at some of the places where the Provincial Exhibitions have heretofore been held, so that many persons have been thereby deterred from visiting these great expositions of Canadian Industry and Arts, Toronto, from its magnitude and ample accommodation, affords sufficient assurance that nothing need be feared on that account. In addition to the private enterprize of the citizens, in seeing that the public are properly provided for, we have the guarantee of an excellent committee of management, and the immediate surveillance of the members of the Board of Agriculture, to warrant

that ample provision will be made for accommodating all visitors and exhibitors, with their animals and articles, at fair and reasonable charges.

Through the liberality of the large steamboat owners, I am authorized to state for the information of the public, that the usual reduced rate of fare, only, will be charged during the show week; and there is little doubt of a like liberal course being adopted by the enterprising managers of the railroads throughout the country.

I have the honour to be, gentlemen,

Your obedient servant,

KINGSTON, July 29th, 1858. WILLIAM FERGUSON.

1st Vice President, Agricultural Association.

MARKHAM PLOUGHING MATCH.—On Tuesday last was held in this place the Ploughing Match of the season. Never before in Canada has there been brought together to test their skill, side by side, so many first class ploughmen as we saw together on this occasion. Canadians and Scotchmen, "Englishmen and Yorkshiremen,"—the comparatively youthful as well as the veteran, all alike true knights of the ploughshare—contended manfully for the prizes. The field selected was on the farm of Captain Armstrong, and of a heavy clay, some rather wet, some broken and rolling, while a considerable portion of the field was very good. We believe every competitor was what is styled a "crack ploughman," and had, in his time, carried off premiums at smaller matches.

The day was as pleasant as was ever experienced under a pure Canadian atmosphere, the sun shone brilliantly, and it was just warm enough to be agreeable. Precisely at fifteen minutes past ten o'clock, the Union Jack was hoisted, and the ploughs started, and continued their work steadily until 2 p. m.; some, whose lands were larger than others, were allowed a proportionate extra time to finish their work.

JUDGES:—Messrs. Alex. Gibb, York; Thomas Aunan, Pickering; George Evans, Scarboro'; Walter Dalzel, Vaughan; James Clark, Markham.

SUCCESSFUL COMPETITORS:—Dougald McLean, 1st Prize, Iron Plough, $40; Archibald Shaw, 2nd do., $25; Duncan McLean, 3rd do., $20; William Hood, 4th do., $15; Matthew McDennie, 5th do., $10; John H. Sylvester, 6th do., $8; James McLean, 7th do., $7; John Bushby, 8th do., $6; James Weir, 9th do., $5; Simpson Rennie 10th do., $4. Total $140.—*From the Markham Economist, April 29th.*

ALDERNEYS FOR KENTUCKY.—The *Homestead* states that John A. Taintor, of Hartford, recently shipped five head of Alderneys—four heifers and a bull—to Hon. Jas. B. Clay, of "Ashland," and adds: "Finer animals of their race we have never had the pleasure of seeing." The Alderneys are superior for the dairy, and are gradually being introduced throughout the country.

DREADFUL FIRE IN SAGUENAY DISTRICT.—A dreadful fire caused by the clearing of lands has occured in the County of Chicoutimi, and has been carried by a strong wind springing up at the time, over the greater part of nine townships in the County, consuming all before it, and rendering desolate and houseless over 150 families, equal to 700 souls. By this calamity, it is said, that more than $100,000 worth of property has been destroyed, besides an immense amount of fencing, with several costly bridges. More than a third of the seed sown this spring has also been destroyed, which will be very severely felt by the settlers, owing to their inability to procure seed and re-sow so late in the season. The residents of the county have come forward most liberally to relieve and assist the unfortunate sufferers, but the means of giving help in a new settlement of the kind, are necessarily inadequate to the absolute wants of the poor sufferers.

THIRTEENTH EXHIBITION OF THE

PROVINCIAL AGRICULTURAL ASSOCIATION,

TO BE HELD AT TORONTO,

On Tuesday, Wednesday, Thursday, and Friday, September 28, 29, 30, *and October* 1, 1858.

RULES AND REGULATIONS.

"The Members of the Agricultural Societies of the several Townships within the County or Electoral Division or United Counties wherein the Annual Exhibition may be held, and the members of the said County or Electoral Division Society, shall be also members of the Association for that year, and have badges accordingly: provided the Agricultural Societies of the said Townships, or the Societies of the said County or Electoral Division or United Counties, shall devote their whole funds for the year, including the Government Grant, in the aid of the Association. The Office bearers of all County Societies shall have badges of free entrance during the Show.—*By-law.*"

1. The payment of $1 and upwards constitutes a person a member of the Agricultural Association of Upper Canada for one year; and $10 for life, when given for that specific object, and not as a contribution to the local funds.

2. No one but a member will be allowed to compete for prizes except in classes XXI, XXIX, XXXV, XXXVII.

3. All Entries must be made on printed forms, which may be obtained of the Secretaries of Agricultural Societies, or of Mechanics' Institutes, free of charge. These forms are to be filled up and signed by the exhibitor, enclosing a dollar for membership, and sent to the Secretary of the Association, Board of Agriculture, Toronto, ON OR BEFORE SATURDAY, SEPTEMBER 12, after which no entries can be taken except in the Horticultural and Ladies' Departments and Foreign classes.

Exhibitors in these Departments may enter articles up to Monday Evening, September 27, when the Books will be finally closed.

4. *Blood Horses and Thorough-bred Cattle* must be entered, and have their full pedigrees properly attested and sent to the Secretary in Toronto, *not later than Saturday, September* 11*th.* No animals will be allowed to compete as pure bred, unless they possess regular Stud and Herd Book pedigrees, or satisfactory evidence be produced that they are directly descended from such stock. All animals entered in the Stock Register, kept by the Board, will be allowed to compete without further enquiry.

5. Badges from the Treasurer's Office will be furnished each member, which will admit himself only, free to every department of the Exhibition, during the Show. Life members admitted free.

6. Tickets of admission to those who are not members, 25 cents each time of admission. Children under 14 years of age, half-price. Carriages, including drivers, $1; passengers to pay 25 cents each. Horsemen to pay 50 cents each admission.

7. Every article, other than live stock, exhibited for competition must be the growth, produce, or manufacture of Canada, except in Class XXIX. Live Stock, except in class XXI, must be the *bona fide* property of persons residing in Canada, and must be exhibited in the name of the owner only. All premiums for articles, except Stock, are to be awarded to *the manufacturers or producers only.* To all Manufactured Articles, the Manufacturer's retail cash price shall be affixed, and to other Articles, the price at which they can be supplied to purchasers.

8. Articles for Exhibition must be on the grounds on Monday, except live stock, which must be there not later than Tuesday at noon.

9. Discretionary Premiums will be awarded for such articles as may be considered worthy by the Judges, although not enumerated in the List, and the Directors will determine the amount of premium.

In the absence of competition in any of the Classes, or if the Stock or articles exhibited be of inferior quality, the Judges will exercise their discretion as to the value of the premiums they recommend.

10. The Judges, Competitors, and Officers of the Association only will be permitted to enter the Show Grounds, until 12 o'clock, on Tuesday, at which hour Members will be admitted. Non-Members will be admitted on *Wednesday, at noon,* and on *Thursday and Friday mornings* after 8 o'clock.

11. No articles or Stock exhibited will be allowed to be removed from the grounds, till the awards are made. without the permission of the President, under the penalty of losing the premiums. An Auctioneer will be on the

ground after the premiums are announced, and every facility afforded for the transaction of business.

12. Delegates, Judges and Members of the Press are requested and expected to report themselves at the Secretary's Office, immediately on their arrival.

13. The Judges are to meet at the Secretary's Office on the Grounds, on Tuesday, at noon, to make arrangements for entering upon their duties.

14. The Annual meeting of the Directors of the Association, will take place on the grounds on Friday morning at 10 o'clock.

15. While the Directors will take every possible precaution, under the circumstances, to ensure the safety of articles sent to the exhibition, yet they wish it to be distinctly understood that the owners of the articles must themselves take the risk of exhibiting them; and that should any article be accidentally injured, lost or stolen, the Directors will give all the assistance in their power towards the recovery of the same, but will not make any payment for the value thereof.

16. The Treasurer will be prepared to commence paying the premiums on Saturday, 2nd October, at 9 a. m., and parties who shall have prizes awarded them are particularly requested to apply for them before leaving Toronto, or leave a written order with some person to receive them, stating the articles for which prizes are claimed.

The Local Committee will make arrangements with Steamboat and Railroad proprietors for carrying articles and passengers at reduced rates.

N. B.—In case the Directors shall require any particular information in reference to animals or articles taking first prizes, the owners will be expected to transmit it, when requested to do so.

Hay will be provided by the Association for the Horses, Cattle, and Sheep exhibited.

PRIZE LIST.

HORSES.

CLASS I.—BLOOD HORSES.

Sect.		$	c.
1.	Best thorough-bred stallion	40	00
	2d do	25	00
	3d do	12	00
2.	Best thorough-bred 3 years old stallion	22	00
	2d do	14	00
	3d do	7	00
3.	Best thorough-bred 2 years old stallion	14	00
	2d do	10	00
	3d do	5	00
4.	Best thorough-bred yearling colt	8	00
	2d do	6	00
	3d do	4	00
5.	Best thorough-bred 3 years old filly	18	00
	2d do	11	00
	3d do	7	00
6.	Best thorough-bred 2 y'r old filly	14	00
	2d do	11	00
	3d do	7	00
7.	Best thorough-bred yearling filly	10	00
	2d do	6	00
	3d do	4	00
8.	Best thorough-bred mare and foal	22	00
	2d do	14	00
	3d do	6	00
9	Extra entries.		

Pedigree to be produced in this class.

CLASS II.—AGRICULTURAL HORSES.

Sect.		$	c.
1.	Best stallion for agricultural purposes	40	00
	2d do	25	00
	3d do	12	00
2.	Best roadster or carriage stallion.	40	00
	2d do	25	00
	3d do	12	00
3.	Best 3 years old stallion	22	00
	2d do	14	00
	3d do	7	00
4.	Best 2 years old stallion	14	00
	2d do	10	00
	3d do	5	00
5.	Best yearling colt	8	00
	2d do	6	00
	3d do	4	00
6.	Best 3 years old filly	18	00
	2d do	11	00
	3d do	7	00
7.	Best 2 years old filly	14	00
	2d do	9	00
	3d do	4	00
8.	Best yearling filly	8	00
	2d do	6	00
	3d do	4	00
9.	Best brood mare and foal, or evidence that the foal has been lost	22	00
	2d do	14	00
	3d do	6	00
10.	Best roadster or carriage brood mare and foal, &c.	22	00
	2d do	14	00
	3d do	6	00
11.	Best span matched carriage horses	20	00
	2d do	15	00
	3d do	10	00
12.	Best saddle horse	10	00
	2d do	8	00
	3d do	6	00

Sect.		$ c.
13. Best single carriage horse in harness		10 00
2d	do	8 00
3d	do	6 00
14. Extra entries.		

CLASS III.—HEAVY DRAUGHT HORSES.

1. Best heavy draught stallion		40 00
2d	do	25 00
3d	do	12 00
2. Best 3 years old stallion		22 00
2d	do	14 00
3d	do	7 00
3. Best 2 years old stallion		14 00
2d	do	10 00
3d	do	5 00
4. Best yearling colt		8 00
2d	do	6 00
3d	do	4 00
5. Best 3 years old filly		18 00
2d	do	11 00
3d	do	7 00
6. Best two years old filly		14 00
2d	do	9 00
3d	do	4 00
7. Best yearling filly		8 00
2d	do	6 00
3d	do	4 00
8. Best brood mare and foal, or evidence that the foal has been lost		22 00
2d	do	14 00
3d	do	6 00
9. Best span of draught horses		20 00
2d	do	15 00
3d	do	10 00
10. Extra Entries.		

CATTLE.

CLASS IV.—DURHAMS.

1. Best aged bull, 5 years old and upwards		36 00
2d	do	24 00
3d	do	16 00
4th	do	8 00
2. Best 4 years old bull		36 00
2d	do	24 00
3d	do	16 00
4th	do	8 00
3. Best 3 years old bull		32 00
2d	do	20 00
3d	do	12 00
4th	do	6 00
4. Best 2 years old bull		24 00
2d	do	16 00
3d	do	9 00
4th	do	5 00
5. Best 1 year old bull		20 00
2d	do	12 00
3d	do	8 00
4th	do	4 00
6. Best bull calf (under 1 year)		16 00
2d	do	10 00
3d	do	6 00
4th	do	3 00
7. Best cow		20 00
2d	do	12 00
3d	do	8 00
4th	do	4 00
8. Best 3 years old cow		16 00
2d	do	8 00
3d	do	6 00
4th	do	4 00
9. Best 2 years old heifer		12 00
2d	do	8 00
3d	do	5 00
4th	do	3 00
10. Best 1 year old heifer		10 00
2d	do	6 00
3d	do	4 00
4th	do	2 00
11. Best heifer calf (under one year).		6 00
2d	do	4 00
3d	do	2 00
4th	do	1 00
12. Extra Entries.		

N.B.—A certificate of HERD BOOK PEDIGREES will be required of all animals in the Durham class. The pedigrees of others should be as full and correct as possible.

CLASS V.—DEVONS.

List of Prizes the same as in Class IV.

CLASS VI.—HEREFORDS.

Prizes the same as Class IV.

CLASS VII.—AYRSHIRES.

Prizes the same as Class IV.

CLASS VIII.—GALLOWAY CATTLE.

Prizes the same as Class IV.

CLASS IX.—GRADE CATTLE.

1. Best cow		20 00
2	do	12 00
3	do	8 00
4th	do	5 00
2. Best 4 years old grade cow		20 00
2d	do	12 00
3d	do	8 00
4th	do	5 00
3. Best 3 years old cow		16 00
2d	do	10 00
3d	do	6 00
4th	do	4 00
4. Best 2 years old heifer		12 00
2d	do	8 00
3d	do	5 00
4th	do	3 00
5. Best 1 year old heifer		10 00
2d	do	6 00
3d	do	4 00
4th	do	2 00
6. Best heifer calf (under 1 year)		6 00
2d	do	4 00
3d	do	2 00
4th	do	1 00
7. Extra Entries.		

DIPLOMAS wil be awarded to the *breeders* or *importers* of bulls and stallions which take *first prizes*, when their names and residences are given.

The Judges shall ascertain, in deciding on bull calves in any of the foregoing classes, whether the animal has been suckled or raised by pail, and make allowances accordingly. The exact age of young animals must be stated on the cards, and will be taken into consideration by the judges in making their awards; and any person understating the age of an animal will forfeit the premium to which he might otherwise be entitled.

A certificate to be produced to show the breeding of animals in class ix.

Young cattle may compete, if the exhibitor think fit, in an older class than to which they properly belong, except in the case of 4 years old bulls, which will not be allowed to compete in the five year old class; but no animal will be allowed to compete in more than one of the foregoing sections.

An animal will not be allowed to compete as a 3 years old cow unless it has had a calf; but a two years old having had a calf will be allowed to compete as a two year old heifer, if the owner thinks fit.

Prizes will be awarded to animals of other breeds than those above mentioned, if deemed worthy.

CLASS X.—FAT AND WORKING CATTLE, ANY BREED.

Sect.		$ c.
1. Best ox or steer		30 00
2d	do	20 00
3d	do	12 00
2. Best cow or heifer		30 00
2d	do	20 00
3d	do	12 00
3. Best yoke of working oxen		20 00
2d	do	12 00
3d	do	8 00
4. Best yoke of 3 years old steers		16 00
2d	do	10 00
3d	do	6 00
5. Best team of oxen, not less than 10 yoke from one township, the property of any number of persons		40 00
6. Extra Entries.		

SHEEP.

CLASS XI.—LEICESTERS.

1. Best ram, two shears and over		16 00
2d	do	10 00
3d	do	4 00
2. Best shearling ram		16 00
2d	do	10 00
3d	do	4 00
3. Best ram lamb		8 00
2d	do	4 00
3d	do	2 00
4. Best 2 ewes, two shears and over		16 00
2d	do	12 00
3d	do	6 00
5. Best 2 shearling ewes		12 00
2d	do	8 00
3d	do	4 00
Sect.		$ c.
6. Best 2 ewe lambs		6 00
2d	do	4 00
3d	do	2 00

CLASS XII.—COTSWOLDS.

Prizes the same as in Class XI.

CLASS XIII.—CHEVIOTS.

Prizes same as in Class XI.

CLASS XIV.—LONG-WOOLED SHEEP, NOT PURE LEICESTERS, COTSWOLD, OR CHEVIOTS.

Prizes the same as in Class XI.

CLASS XV.—SOUTHDOWNS.

Prizes the same as in Class XI.

CLASS XVI.—MERINOS AND SAXONS.

Prizes the same as in Class XI.

CLASS XVII.—FAT SHEEP.

1. Best 2 fat weathers		12 00
2d	do	8 00
3d	do	4 00
2. Best 2 fat ewes		12 00
2d	do	8 00
3d	do	4 00

3. Extra entries in Sheep.

Sheep that have been shown in any other class cannot compete as Fat Sheep.

[Sheep will not be allowed to compete with more than the present year's growth of wool upon them.]

CLASS XVIII.—LARGE BREED PIGS.

1. Best boar, 1 year and over		20 00
2d	do	12 00
3d	do	8 00
2. Best breeding sow, 1 year and over		12 00
2d	do	8 00
3d	do	4 00
3. Best boar, under 1 year		12 00
2d	do	8 00
3d	do	4 00
4. Best sow, under 1 year		8 00
2d	do	6 00
3d	do	4 00

CLASS XIX.—SMALL BREED PIGS.

Prizes the same as Class XVIII.

In the classes of pigs, the *precise age* of the animal is to be *stated on the cards.*

With the view of encouraging largely the importation of improved stock, the exhibitor of any male animal imported into this Province from Europe since the last Exhibition, which shall take the first prize in any of the above classes, will be paid three times the amount of the premium offered in the list; the exhibitor of any female animal imported from Europe within the same time taking the first prize will be paid double the amount offered: the exhibitor of any male animal imported into the the Province from any part of America within the same time, taking the first prize, will be paid double the amount of prize offered; and of any female animal imported within the same time, and taking the first prize, one half in addition to the amount of prize offered in the

list. Such animals to be the *bona fide* property of persons residing in Upper Canada. Satisfactory evidence must have been given at the time of making the entry that the animal has been imported within the time named, or the increased prize will not be paid.

CLASS XX.—POULTRY, &C.

Sect.		$	c.
1.	Best pair of white dorkings	4	00
	2d do	2	00
2.	Best pair of spangled do	4	00
	2d do	2	00
3.	Best pair of black Polands	4	00
	2d do	2	00
4.	Best pair of white Polands	4	00
	2d do	2	00
5.	Best pair of golden Polands	4	00
	2d do	2	00
6.	Best pair of silver Polands	4	00
	2d do	2	00
7.	Best pair of game fowls	4	00
	2d do	2	00
8.	Best pair of Jersey blues	4	00
	2d do	2	00
9.	Best pair of Cochin China, Shanghai, Canton, or Bramah Pootra fowls	4	00
	2d do	2	00
10.	Best pair of black Spanish fowls.	4	00
	2d do	2	00
11.	Best pair of black Java fowls	4	00
	2d do	2	00
12.	Best pair of Bolton grays	4	00
	2d do	2	00
13.	Best pair of Bolton bays	4	00
	2d do	2	00
14.	Best pair of Hamburg fowls	4	00
	2d do	2	00
15.	Best pair of Dominique	4	00
	2d do	2	00
16.	Best pair of feather-legged bantams	2	00
	2d do	1	00
17.	Best pair of smooth-legged bantams	2	00
	2d do	1	00
18.	Best pair of turkeys (white or colored)	4	00
	2d do	2	00
19.	Best pair of wild turkeys	4	00
	2d do	2	00
20.	Best pair of large geese	4	00
	2d do	2	00
21.	Best pair Bremen geese	4	00
	2d do	2	00
22.	Best pair of Chinese geese	4	00
	2d do	2	00
23.	Best pair of Muscovy ducks	4	00
	2d do	2	00
24.	Best pair common ducks	4	00
	2d do	2	00
25.	Best pair of Aylesbury ducks	4	00
	2d do	2	00
26.	Best pair of Poland ducks	4	00
	2d do	2	00
27.	Best pair of Rouen ducks	4	00
	2d do	2	00
28.	Best pair of Guinea fowls	4	00
	2d do	2	00
29.	Best pair of pea fowls	4	00
	2d do	2	00
30.	Best collection of pigeons	4	00
	2d do	2	00
31.	Best lot of poultry in one pen, owned by the exhibitor	6	00
32.	Best collection of poultry entered in the various classes by one exhibitor	8	00
33.	Best pair of rabbits	2	00
34.	Best lot of rabbits	4	00
35.	Other entries.		

Exhibiters will have to provide their own coops, and are recommended to have them about 3 feet cube in size for convenience of arrangement on the grounds.

XXI.—FOREIGN STOCK.

1.	Best Durham bull, over 5 years, diploma and	10	00
	2d do	10	00
2.	Best Durham cow, diploma and	6	00
	2d do	6	00
3.	Best Ayrshire bull, diploma and	10	00
	do do	10	00
4.	Best Ayrshire cow, diploma and	6	00
	2d do	6	00
5.	Best Hereford bull, diploma and	10	00
	2d do	10	00
6.	Best Hereford cow, diploma and	6	00
	2d do	6	00
7.	Best Devon bull, diploma and	10	00
	2d do	10	00
8.	Best Devon cow diploma and	6	00
	2d do	6	00
9.	Best stallion for agricultural purposes diploma and	12	00
	2d do	12	00
10.	Best blood stallion, diploma and	12	00
	2d do	12	00
11.	Best Leicester ram, diploma and	6	00
	2d do	4	00
12.	Best 3 Leicester ewes, diploma and	6	00
	2d do	6	00
13.	Best Southdown ram, diploma and	6	00
	2d do	6	00
14.	Best 2 Southdown ewes, dip. and	6	00
	2d do	6	00
15.	Best Merino and Saxon ram dip. and	6	00
	2d do	6	00
16.	Best two Merino or Saxon ewes, dip. and	6	00
	2d do	6	00
17.	Best Boar, diploma and	6	00
	2d do	6	00
18.	Best Breeding Sow, diploma and	6	00
	2d do	6	00
19.	Extra Entries in Foreign Stock.		

AGRICULTURAL PRODUCTIONS.

CLASS XXII.—GRAINS, SEEDS, &C.

The Canada Company's prize of		100	00
1.	For the best 25 bushels of Fall Wheat the produce of Canada West, being the growth of the year 1858. The prize to be		

Sect.		$ c.
	awarded to the actual grower only of the Wheat, which is to be given up to and become the property of the Association, for distribution to the County Societies for seed.	
2d	do by the Association.	40 00
3d	do	20 00

The winners of the 2nd and 3rd prizes to retain their wheat.

The winners of these prizes will be required to furnish the Secretary with a written statement of the nature of the soil, mode of preparation, quantity of seed, and time of sowing, manures (if any used) produce per acre of grain, and any other particulars of practical importance, before being paid the amount of premium. Winners of prizes in the succeeding sections of this class will also be expected to furnish information when applied for.

2.	Best two bushels of winter wheat.		10 00
	2d	do	8 00
	3d	do	6 00
	4th	do	4 00
3.	Best two bushels spring wheat		10 00
	2d	do	8 00
	3d	do	6 00
	4th	do	4 00
4.	Best two bushels of barley (two rowed)		6 00
	2d	do	4 00
	3d	do	2 00
	4th	do ....Vol. Transactions.	
5.	Best two bushels of barley (six rowed)		6 00
	2d	do	4 00
	3d	do	2 00
	4th	do	Trans.
6.	Best two bushels rye		6 00
	2d	do	4 00
	3d	do	2 00
	4th	do	Trans.
7.	Best two bushels of oats (white)		6 00
	2d	do	4 00
	3d	do	2 00
	4th	do	Trans
8.	Best 2 bushels of oats (black)		6 00
	2d	do	5 00
	3d	do	3 00
	4th	do	Trans
9.	Best two bushels of field peas		6 00
	2d	do	5 00
	3d	do	3 00
	4th	do	2 00
10.	Best 2 bushels of marrow fat peas.		6 00
	2d	do	4 00
	3d	do	3 00
	4th	do	2 00
11.	Best two bushels tares		6 00
	2d	do	5 00
	3d	do	3 00
	4th	do	Trans
12.	Best bushel of white field beans		6 00
	2d	do	4 00
	3d	do	3 00
	4th	do	Trans
13.	Best two bushels Indian corn in ear [white]		6 00
	2d	do	5 00
	3d	do	3 00
	4th	do	Trans.
14.	Best two do [yellow]		6 00
	2d	do	5 00
	3d	do	3 00
	4th	do	Trans.
15.	Best bushel of timothy seed		8 00
	2d	do	6 00
	3d	do	4 00
16.	Best bushel of clover seed		8 00
	2d	do	6 00
	3d	do	4 00
17.	Best bushel hemp seed		6 00
	2d	do	4 00
	3d	do	2 00
18.	Best bushel flax seed		6 00
	2d	do	4 00
	3d	do	2 00
19.	Best bushel mustard seed		6 00
	2d	do	4 00
	3d	do	2 00
20.	Best Swedish turnip seed, from transplanted bulbs, not less than 20 lbs		6 00
	2d	do	4 00
	3d	do	2 00
21.	Best 12 lbs field carrot seed		6 00
	2d	do	4 00
	3d	do	2 00
22.	Best 12 lbs yellow mangel wurzel seed		6 00
	2d	do	4 00
	3d	do	2 00
23.	Best bale of hops, not less than 112 lbs		20 00
	2d	do	12 00
	3d	do	8 00
24.	Extra entries.		

CLASS XXIII.—ROOTS AND OTHER FIELD CROPS.

1.	Best bushel pink-eyed potatoes		3 00
	2d	do	2 00
	3d	do	1 00
2.	Best bushel cup potatoes		3 00
	2d	do	2 00
	3d	do	Trans.
3.	Best bushel goldfinders		3 00
	2d	do	2 00
	3d	do	1 00
4.	Best bushel white potatoes		3 00
	2d	do	2 00
	3d	do	Trans.
5.	Best bushel red do		3 00
	2d	do	2 00
	3d	do	1 00
6.	Best bushel blue do		3 00
	2d	do	2 00
	3d	do	Trans.
7.	Best bushel of any other sort		3 00
	2d	do	2 00
	3d	do	1 00
8.	Best bushel swede turnips		3 00
	2d	do	2 00
	3d	do	1 00

Sect.		$ c.
9.	Best bushel of white globe turnips	3 00
	2d do	2 00
	3d do	1 00
10.	Best bushel of Aberdeen yellow turnips	3 00
	2d do	2 00
	3d do	Trans.
11.	Best 20 roots red carrots	3 00
	2d do	2 00
	3d do	1 00
12.	Best 20 roots white or Belgian carrots	3 00
	2d do	2 00
	3d do	1 60
13.	Best 12 roots mangel wurzel (long red)	3 00
	2d do	2 00
	3d do	1 00
14.	Best 12 roots yellow globe mangel wurzel	3 00
	2d do	3 00
	3d do	1 00
15.	Best 12 roots long yellow mangel wurzel	3 00
	2d do	2 00
	3d do	Trans.
16.	Best 12 roots of khol rabi	2 00
	2d do	1 00
17.	Best 12 roots of sugar beet	3 00
	2d do	2 00
	3d do	Trans.
18.	Best 20 roots of parsnips	3 00
	2d do	2 00
	3d do	Trans.
19.	Best 20 roots of chicory	3 00
	2d do	2 00
	3d do	1 00
20.	Best two large squashes for cattle	3 00
	2d do	2 00
	3d do	Trans.
21.	Best two mammoth field pumpkins	3 00
	2d do	2 00
	3d do	Trans.
22.	Best four common yellow field	3 00
	2d do	2 00
	3d do	1 00
23.	Best 20 lbs of tobacco leaf, growth of Canada West	4 00
	2d do	2 00
24.	Best broom corn brush, 28 lbs	4 00
	2d do	3 00
	3d do	2 00

The Canada Company's Prize for Flax.

25.	Best 112 lbs. of Flax	24 00
	2d do by the Association	16 00
	3d do do do	8 00

The Canada Company's Prize for Hemp.

26.	Best 112 lbs of Hemp	16 00
	2d do by the Association	12 00
	3d do do do	6 00
27.	Other entries.	

[The Roots in the above class to be certified as of field culture by the Exhibitor.]

Turnips of other varieties than those above named will receive prizes if worthy.

The names of the different varieties of wheat or other grain, roots, &c., must be inserted in the list of entries by each exhibitor.

HORTICULTURAL PRODUCTS.

CLASS XXIV.—FRUIT.

Sect.		$ c.
1.	Best 20 varieties of apples, named, [six of each]	5 00
	2d do	4 00
	3d do	3 00
2.	Best 12 table apples, named, [Fall sort]	3 00
	2d do	2 00
	3d do	1 00
3.	Best 12 table apples, named, [Winter sort]	3 00
	2d do	2 00
	3d do	1 00
4.	Best 12 baking apples, named,	3 00
	2d do	2 00
	3d do	1 00
5.	Best 20 varieties of pears, named [three of each]	5 00
	2d do	4 00
	3d do	3 00
6.	Best 12 table pears, named, [Fall sort]	3 00
	2d do	2 00
	3d do	1 00
7.	Best 12 Table Pears, named [Winter sort]	3 00
	2d do	2 00
	3d do	1 00
8.	Best dozen plums, named, (Dessert)	3 00
	2d do	2 00
	3d do	1 00
9.	Best 12 baking plums, named	3 00
	2d do	2 00
	3d do	1 00
10.	Best quart of Damsons (English)	3 00
	2d do	2 00
	3d do	1 00
11.	Best 12 peaches, grown in open air, named	3 00
	6d do	2 00
	3d do	1 00
12.	Best 10 varieties of Peaches, grown in open air [3 of each]	4 00
	2d do	3 00
	3d do	2 00
13.	Best 12 Quinces	2 00
	2d do	1 50
	3d do	Trans.
14.	Best 3 clusters of grapes (hot house)	4 00
	2d do	3 00
	3d do	2 00
15.	Best 3 clusters black Hamburgh (hot-house)	4 00
	2d do	3 00
	3d do	2 00
16.	Best four clusters black grapes, grown in open air	2 00
	2d do	1 50
	3d do	1 00

Sect.		$ c.
17. Best four clusters white grapes, grown in open air		2 00
2d	do	1 50
3d	do	1 00
18. Best four clusters grapes, of any other sorts (open air)		2 00
2d	do	1 50
3d	do	Trans.
19. Best and heaviest 2 bunches of grapes, (open air)		3 00
2d	do	2 00
3d	do	1 50
20. Best collection of grapes, grown in open air, 2 clusters of each sort		4 00
2d	do	3 00
3d	do	2 00
21. Best Water Melon		2 00
2d	do	1 50
3d	do	Trans.
22. Best Musk Melon of any sort		2 00
2d	do	1 50
3d	do	1 00
23. Best 6 Citrons for preserving		2 00
2d	do	1 50
3d	do	Trans.
24. Best 6 Nectarines		2 00
2d	do	1 50
3d	do	1 00
25. Best display of fruit, the growth of Exhibitor, [distinct from other entries], not more than three specimens of each sort		10 00
2d	do	6 00
3d	do	4 00
26. Extra entries.		

CLASS XXV.—GARDEN VEGETABLES.

1. Best 12 Roots of Salsify		2 00
2d	do	1 50
3d	do	1 00
2. Best 4 heads Brocoli		2 00
2d	do	1 50
3d	do	1 00
3. Best 4 heads Cauliflower		2 00
2d	do	1 50
3d	do	1 00
4. Best 4 heads Cabbage [Summer]		2 00
2d	do	1 50
3d	do	1 00
5. Best 4 heads Cabbage [Winter]		2 00
2d	do	1 50
3d	do	1 00
6. Best 4 sorts Winter Cabbage, including Savoys, 2 of each sort		3 00
2d	do	2 00
3d	do	1 00
7. Best 4 heads Red Cabbage		2 00
2d	do	1 50
3d	do	1 00
8. Best 12 Carrots for Table, long red		2 00
2d	do	1 50
3d	do	1 00
9. Best 12 Early Horn Carrots		2 00
2d	do	1 50
3d	do	1 00
10. Best 12 Table Parsnips		2 00
2d	do	1 50
3d	do	1 00
11. Best 6 Roots of White Celery		2 00
2d	do	1 50
3d	do	1 00
12. Best 6 Roots of Red Celery		2 00
2d	do	1 50
3d	do	1 00
13. Best dozen Capsicums		2 00
2d	do	1 50
3d	do	Trans.
14. Best collection Capsicums		3 00
2d	do	2 00
3d	do	1 50
15. Best 6 Egg Plants, purple		2 00
2d	do	1 50
3d	do	1 00
16. Best 12 Tomatoes		2 00
2d	do	1 50
3d	do	Trans.
17. Best assorted collection of Tomatoes, 6 of each sort		3 00
2d	do	2 00
3d	do	1 50
18. Best 12 Blood Beets		2 00
2d	do	1 50
3d	do	Trans.
19. Best Peck of White Onions		2 00
2d	do	1 50
3d	do	1 00
20. Best Peck of Yellow Onions		2 00
2d	do	1 50
3d	do	Trans.
21. Best Peck of Red Onions		2 00
2d	do	1 50
3d	do	1 00
22. Best 12 White Turnips, (table)		2 00
2d	do	1 50
3d	do	Trans.
23. Best 12 Yellow Turnips, (table)		2 00
2d	do	1 50
3d	do	1 00
24. Best 12 ears Sweet Corn		2 00
2d	do	1 50
3d	do	Trans.
25. Best and greatest variety of early Potatoes, half peck of each sort, named		3 00
2d	do	2 00
3d	do	1 00
26. Best 4 Squashes, table		2 00
2d	do	1 50
3d	do	1 00
27. Best and greatest variety of Vegetables, [distinct from other entries], each kind named		4 00
2d	do	3 00
3d	do	2 00
28. Extra entries.		

CLASS XXVI.—PLANTS AND FLOWERS.

1. Best dozen Dahlias, named		2 00
2d	do	1 50
3d	do	1 00
2. Best and largest collection of Dahlias		5 00
2d	do	4 00
3d	do	3 00

Sect.		$ c.
3. Best bouquet of cut flowers, (for table)		2 00
2d	do	1 50
3d	do	1 00
4. Best hand bouquet		2 00
2d	do	1 50
3d	do	1 00
5. Best collection of green house plants, not less than 12 specimens		10 00
2d	do	6 00
3d	do	4 00
6. Best twelve Pansies		2 00
2d	do	1 50
3d	do	1 00
7. Best six Fuchsias, in flower		3 00
2d	do	2 00
3d	do	1 00
8. Best collection of Annuals in bloom		2 00
2d	do	1 50
3d	do	1 00
9. Best six Cockscombs		2 00
2d	do	1 50
3d	do	1 00
10. Best six Balsams in bloom		2 00
2d	do	1 50
3d	do	1 00
11. Best collection of China Asters		2 00
2d	do	1 50
3d	do	1 00
12. Best collection of ten week's stock		2 00
2d	do	1 50
3d	do	1 00
13. Best collection of hybrid perpetual roses, not less than 12 blooms		2 00
2d	do	1 50
3d	do	1 00
14. Best floral ornament or design		5 00
2d	do	4 00
3d	do	3 00
15. Best collection of verbenas, not less than 12 varieties		3 00
2d	do	2 00
3d	do	1 00
16. Best 6 petunias		2 00
2d	do	1 50
3d	do	1 00
17. Best 12 Phloxes		2 00
2d	do	1 50
3d	do	1 00
18. Best 6 hardy shrubs		2 00
2d	do	1 50
3d	do	1 00
19. Best 12 holly hocks		2 00
2d	do	1 50
3d	do	1 00
20. Best display of plants in flower, distinct from other entries		10 00
2d	do	6 00
3d	do	4 00
21. Best collection of native plants, dried and named		6 00
2d	do	4 00
3d	do	2 00
22. Best specimen of useful and ornamental rustic work for the garden		4 00
2d	do	3 00
3d	do	2 00

23. Extra entries.

Competitors in classes 24, 25, & 26, are requested to deliver their various productions in a clean and proper state for exhibition.

CLASS XXVII.—DAIRY PRODUCTS, &C.

1. Best firkin of butter, not less than 28 lbs		10 00
2d	do	8 00
3d	do	6 00
4th	do	4 00
2. Best cheese, not less than 30 lbs.		10 00
2d	do	8 00
3d	do	6 00
4th	do	4 00
3. Best two Stilton cheese, not less than 14 lbs. each		10 00
2d	do	8 00
3d	do	6 00
4th	do	4 00
4. Best butter, not less than 14 lbs., in firkins, crocks, or tubs		6 00
2d	do	5 00
3d	do	4 00
4th	do	3 00
5. Best honey, in the comb, not less than 10 lbs		3 00
2d	do	2 00
3d	do	Trans.
6. Best jar of clear honey		4 00
2d	do	2 00
3d	do	Trans.

7. Extra entries.

Persons taking premiums on dairy products will be required to furnish statements of the mode of manufacture, including the breed and number of cows, size of farm, description of dairy premises, treatment of milk, salt, &c., quantity of produce, and any other practical information that they may be able to afford, before being paid the amount of premium.

CLASS XXVIII.—AGRICULTURAL IMPLEMENTS.

1. Best wooden plough, diploma and		12 00
2d	do	8 00
3d	do	4 00
2. Best iron plough, diploma and		12 00
2d	do	8 00
3d	do	4 00

[The ploughs to be tested on the field, on the Tuesday, by a Committee appointed for the purpose, at the Exhibition; ease of draught and efficiency of work to be considered.]

3. Best subsoil plough, diploma and		12 00
2d	do	8 00
3d	do	4 00
4. Best double shear Trench plough		10 00
2d	do	6 00
3d	do	4 00
5. Best double mould plough		10 00
2d	do	6 00
3d	do	4 00

Sect.		$ c.
6.	Best pair of harrows	6 00
	2d do	4 00
	3d do	2 00
7.	Best fanning mill, diploma and	6 00
	2d do	4 00
	3d do	2 00
8.	Best horse-power thresher and separator, diploma and	20 00
	2d do	12 00
	3d do	8 00
9.	Best grain drill, diploma and	12 00
	2d do	8 00
	3d do	4 00
10.	Best seed drill or barrow	4 00
	2d do	3 00
	3d do	2 00
11.	Best straw cutter, (hand)	5 00
	2d do	4 00
	3d do	3 00
12.	Best straw cutter, (power)	5 00
	2d do	4 00
	3d do	3 00
13.	Best smut machine	6 00
	2d do	3 00
14.	Best portable grist mill	12 00
	2d do	8 00
	3d do	4 00
15.	Best grain cracker	8 00
	2d do	6 00
	3d do	4 00
16.	Best corn and cob crusher	4 00
	2d do	3 00
	3d do	2 00
17.	Best machine for cutting roots for stock	6 00
	2d do	4 00
	3d do	2 00
18.	Best clover cleaning machine	12 00
	2d do	8 00
	3d do	4 00
19.	Best cider mill and press	12 00
	2d do	8 00
20.	Best cheese press	8 00
	2d do	6 00
21.	Best churn	3 00
	2d do	2 00
22.	Best two-horse waggon	12 00
	2d do	8 00
	3d do	4 00
23.	Best one-horse light market wagon	10 00
	2d do	8 00
	3d do	4 00
24.	Best horse cart	6 00
	2d do	4 00
	3d do	2 00
25.	Best farm sleigh	8 00
	2d do	4 00
	3d do	2 00
26.	Best horse rake	4 00
	2d do	3 00
	3d do	2 00
27.	Best metal roller	11 00
	2d do	8 00
28.	Best wooden roller	10 00
	2d do	5 00
29.	Best garden roller	4 00
	2d do	2 00
30.	Best stump extractor	8 00
	2d do	4 00
31.	Best reaping machine, dip. and	20 00
	2d do	12 00
	3d do	8 00
32.	Best mowing machine, dip. and	20 00
	2d do	12 00
	3d do	8 00
33.	Best combined mower and reaper dip. and	20 00
	2d do	12 00
	3d do	8 00
34.	Best potato digger	3 00
	2d do	2 00
	3d do	1 00
35.	Best thistle extractor	2 00
	do do	1 00
36.	Best farm gate	3 00
	2d do	2 00
	3d do	1 00
37.	Best specimen wire fencing, not less than 2 rods, erected on the ground	8 00
	2d do	6 00
	3d do	4 00
38.	Best field or two-horse cultivator	12 00
	2d do	8 00
	3d do	4 00
39.	Best horse hoe, or single horse cultivator	4 00
	2d do	3 00
40.	Best (power) post hole borer	12 00
	2d do	8 00
41.	Best wooden pump	4 00
	2d do	3 00
42.	Best Machine for making drain tiles, dip. and	10 00
	2d do	6 00
43.	Best brick making machine	10 00
	2d do	6 00
44.	Best half-dozen hay rakes	3 00
	2d do	2 00
	3d do	Trans
45.	Best half-dozen manure forks	3 00
	2d do	2 00
	3d do	Trans
46.	Best half-dozen hay forks	3 00
	2d do	2 00
	3d do	Trans
47.	Best half-dozen scythe snaiths	3 00
	2d do	2 00
	3d do	Trans
48.	Best ox-yoke and bows	2 00
	2d do	1 00
49.	Best grain cradle	2 00
	2d do	1 00
50.	Best half-dozen grain shovels	3 00
	2d do	2 00
	3d do	Trans
51.	Best half-dozen iron (flat) shovels	3 00
	2d do	2 00
	3d do	Trans
52.	Best half-dozen spades	3 00
	2d do	2 00
	3d do	Trans
53.	Best half-dozen steel hoes	3 00
	2d do	2 00
	3d do	Trans

Sect.		$ c.
54.	Best half-dozen grass scythes	3 00
	2d	2 00
	3d	1 00
55.	Best half-dozen cradle scythes	3 00
	2d do	2 00
	3d do	1 00
56.	Best straw fork, wood,	2 00
	2d do	1 00
57.	Extra entries.	

CLASS XXIX.—FOREIGN AGRICULTURAL IMPLEMENTS.

1.	Best plough, diploma and	4 00
2.	" Subsoil Plough, diploma and	4 00
3.	" Pair Harrows	4 00
4.	" Fanning Mill, diploma and	4 00
5.	" Horse power thrasher and separator, diploma and	10 00
6.	" Seed drill or barrow, dip. and	4 00
7.	" Straw cutter	4 00
8.	" Smut machine	4 00
9.	" Portable grist mill, dip. and	10 00
10.	" Grain cracker.	6 00
11.	" Machine for cutting roots for stock	4 00
12.	" Corn and cob crusher.	4 00
13.	" Clover machine, diploma and	8 00
14.	" Reaping machine, diploma and	10 00
15.	" Cultivator, diploma and	5 00
16.	" Assortment of agricultural implements, and edge tools, diploma	20 00
17.	" Extra entries.	

CLASS XXX.—CABINET WARE AND OTHER WOOD MANUFACTURES.

1.	Beehive, best model	3 00
2.	Board Rule, best	2 00
3.	Brooms, best half-dozen, corn	2 00
4.	Broom handles, best dozen, turned	2 00
5.	Canadian Woods, best collection of	20 00
	2d do	10 00
6.	Centre Table, best	6 00
	2d do	4 00
7.	Cooper's Work, best specimen	5 00
	2d do	3 00
8.	Curled hair, best 10 lbs of	3 00
	2d do	2 00
9.	Dining Table, best	5 00
	2d do	3 00
10.	Dining-room chairs, best six	5 00
	2d do	3 00
11.	Drawing-room sofa, best	8 00
	2d do	5 00
12.	Drawing-room chairs, best set of	8 00
	2d do	5 00
13.	Door, best 4 or 6 pannelled	3 00
	2d do	2 00
14.	Flour barrels, best half-dozen	3 00
	2d do	2 00
15.	Machine-wrought moulding, best 100 feet of	3 00
	2d do	2 00
16.	Machine-wrought flooring, best 100 feet of	3 00
	2d do	2 00
17.	Ottoman, best	3 00
	2d do	2 00
18.	School Desk and Chairs, best [price considered]	4 00
19.	Shingles, split, best 2 bundles of	3 00
	2d do	2 00
20.	Shingles, sawed, best 2 bundles of	3 00
	2d do	2 00
21.	Side-board, best	6 00
	2d do	4 00
22.	Spinning-wheel, best	2 00
	2d do	1 00
23.	Turning in wood, best collection of specimens of	6 00
	2d do	4 00
24.	Veneers from Canadian woods, best	5 00
	2d do	3 00
25.	Wash tubs, best 3	2 00
	2d do	1 00
26.	Wash boards, zinc covered, best half-dozen	3 00
27.	Wash boards, not covered, best half-dozen	2 00
28.	Willow Ware, best half-dozen specimens of	3 00
	2d do	2 00
29.	Wooden Pails, best half-dozen	2 00
	2d do	1 00
30.	Window sash hung in frame, best, [12 lights]	4 00
	2d do	3 00
31.	Best collection of handles for axes, adzes, and carpenters, framers, blacksmiths, gunsmiths, coopers, and watch-makers' tools	10 00
	2d do	5 00
32.	Extra entries.	

CLASS XXXI.—CARRIAGES, SLEIGHS, &C.

1.	Axle, best wrought iron	3 00
2.	Bent Shafts, best half-dozen	3 00
3.	Carriage Hubs, best 2 pairs of	3 00
4.	Carriage Rims or Fellows, best specimen of	3 00
5.	Carriage Spokes, machine-made, best dozen	3 00
6.	Carriage, best 2 horse pleasure	10 00
	2d do	6 00
7.	Carriage, best 1 horse pleasure	8 00
	2d do	5 00
8.	Child's Carriage, best, [price considered]	3 00
9.	Sleigh, best 2 horse pleasure	8 00
	2d do	5 00
10.	Sleigh, best 1 horse pleasure	6 00
	2d do	4 00
11.	Springs, best pair of steel carriage	3 00
12.	Extra entries.	

CLASS XXXII.—FINE ARTS.

Professional List—Oil.

1.	Animals, best, [grouped or single]	12 00
	2d do	6 00
2.	Historical Painting, best, Canadian subject	12 00
	2d do	6 00
3.	Landscape, best, Canadian subject	12 00
	2d do	6 00

Sect.		$ c.
4.	Marine Painting, best, Canadian subject	12 00
	2d do	6 00
5.	Original Composition, best other	12 00
	2d do	6 00
6.	Portrait, best	10 00
	2d do	6 00
	In Water Colors.	
7.	Animals, best, [grouped or single]	8 00
	2d do	5 00
8.	Flowers, best, [grouped or single]	5 00
	2d do	3 00
9.	Landscape, best, Canadian subject	8 00
	3d do	5 00
10.	Marine View, best, Canadian subject	8 00
	2d do	5 00
11.	Miniature, best	6 00
	2d do	4 00
12.	Original Composition, best other	8 00
	2d do	5 00
13.	Portrait, best	6 00
	do do	4 00
	Pencil, Crayon, &c.	
14.	Colored Crayon, best	5 00
	2d do	3 00
15.	Crayon Drawing, best	5 00
	2d do	3 00
16.	Pencil Drawing, best	5 00
	2d do	3 00
17.	Pen and Ink sketch, best,	5 00
	2d do	3 00
18.	Portrait, best pencil	5 00
	2d do	3 00
19.	Portrait, best crayon	5 00
	2d do	3 00
	Amateur List—Oil.	
20.	Animals, best, grouped or single	8 00
	2d do	5 00
21.	Historical Painting, best, Canadian subject	8 00
	2d do	5 00
22.	Landscape, best, Canadian subject	8 00
	2d do	5 00
23.	Marine Painting, best, Canadian subject	5 00
24.	Portrait, best	5 00
	2d do	3 00
	In Water Colours	
25.	Animals, best, [grouped or single]	6 00
	2d do	4 00
26.	Flowers, best	4 00
	2d do	3 00
27.	Landscape, best, Canadian subject	6 00
	2d do	4 00
28.	Marine View, best, [Canadian subject]	6 00
	2d do	4 00
29.	Miniature, best	5 00
	2d do	3 00
30.	Portrait, best	5 00
	2d do	3 00

Sect.		$ c.
	Pencil, Crayon, &c.	
31.	Coloured Crayon, best	4 00
	2d do	3 00
32.	Crayon Drawing, best	4 00
	2d do	3 00
33.	Pencil Drawing, best	4 00
	2d do	3 00
34.	Pen and Ink Sketch, best	4 00
	2d do	3 00
35.	Portrait, best Pencil	4 00
	2d do	3 00
36.	Portrait, best Crayon	4 00
	2d do	3 00
	Architectural Drawing, Modelling, Engraving, &c., &c.	
37.	Architectural Drawing, best	6 00
	2d do	4 00
38.	Architectural Drawing, best perspective	6 00
	2d do	4 00
39.	Ambrotypes, best collection of	6 00
	2d do	4 00
40.	Carving in wood best specimen of	8 00
41.	Carving in stone, best specimen of	8 00
42.	Carving and gilding, best specimen of	8 00
	2d do	5 00
43.	Composition of natural foliage [Canadian] applicable to architectural details, best drawing	8 00
	2d do	5 00
44.	Electrotyping, best specimen of	4 00
45.	Engraving [block with proof] best wood	6 00
	2d do	4 00
46.	Engraving on Copper, best	6 00
	2d do	4 00
47.	Engraving on Steel, best	6 00
	do do	4 00
48.	Engraving, best seal	8 00
49.	Geometrical Drawing of Engine or millwright work, best colour'd	6 00
	2d do	4 00
50.	Lithographic drawing, best	6 00
	2d do	4 00
51.	Lithographic drawing, best colored	8 00
52.	Lithographic drawing on Canadian stone, best	6 00
53.	Machinery, best perspective drawing of	6 00
	2d do	4 00
54.	Modelling in plaster, best specimen	8 00
	2d do	5 00
55.	Modelling in plaster of natural foliage [Canadian] applicable to architectural details, best specimen of	8 00
	2d do	5 00
56.	Penmanship, best specimen of ornamental	4 00
	2d do	2 00
57.	Photographs, best collection of	8 00
	2d do	5 00
58.	Stained glass, best specimen of	8 00
	2d do	5 00

Sect.		$ c.
59.	Surveyor's plans, best	6 00
	2d do	4 00
60.	Extra Entries.	

CLASS XXXIII.—GROCERIES, PROVISIONS, &C.

1	Bacon—two sides—best [state mode of curing]	3 00
	2d do	2 00
2	Barley—pot and pearl—best samples of	3 00
	2d do	2 00
3	Biscuits, best collection of specimens of	4 00
4	Blacking, best sample of shoe	2 00
5	Bottled Fruits, best collection of.	3 00
	2d do	2 00
6	Bottled Pickles, best collection of.	3 00
	2d do	2 00
7	Buckwheat Flour, best sample of.	3 00
	2d do	2 00
8	Candles, best collection of	3 00
	2d do	2 00
9	Cayenne pepper, [from Capsicums grown in the province] best jar of	2 00
10	Chickory, best 20 lbs of	4 00
	2d do	2 00
11	Confectionery, best collection of...	5 00
	2d do	3 00
12	Flour, best sample of	6 00
	2d do	4 00
13	Glue—14lbs—best sample of	4 00
	2d do	2 00
14	Hams, best two [state mode of curing]	3 00
	2d do	2 00
15	Indian corn meal, best sample of...	3 00
	2d do	2 00
16	Isinglass, best sample of	2 00
17	Matches, best friction	2 00
	2d do	1 00
18	Medicinal herbs, roots and plants [native growth] best collection of	8 00
	2d do	4 00
19	Mustard, best jar of	3 00
20	Oatmeal, best sample of	3 00
	2d do	2 00
21	Oils extracted from plants, best specimens of	3 00
	2d do	2 00
22	Oils—linseed and rape—best specimen of	3 00
	2d do	2 00
23	Preserves, best six kinds of	3 00
	2d do	2 00
24	Preserved meats, best can of	3 00
	2d do	2 00
25	Sauces for table use, best lot of..	3 00
	2d do	2 00
26	Soap—28 lbs—best box of	3 00
	2d do	2 00
27	Soaps—collection assorted—best fancy	5 00
	2d do	3 00
28	Starch, best 12 lbs of potato	3 00
29	do do corn	3 00
30	do do flour	3 00
31	Sugar, best 30 lbs of maple	4 00
32	do do beet root	4 00
33	do best 20 lbs of corn stalk	4 00
34	do best loaf of refined.....4	4 00
	do do do	2 00
35	Tobacco—14 lbs—best Canadian manufactured	4 00
	2d do	2 00
36	Extra Entries	

CLASS XXXIV.—HATS, FURS, AND WEARING APPAREL.

1	Business coat, best gentleman's..	4 00
	2d do	3 00
2	Fur cap, best gentleman's	3 00
	2d do	2 00
3	Fur gloves, mits or gauntlets, best..	3 00
	2d do	2 00
4	Fur sleigh robe, best	4 00
	2d do	3 00
5	Gloves and mits, best buckskin	2 00
	2d do	1 00
6	Gloves and mits, best of any other leather	2 00
	2d do	1 00
7	Gloves and mits, best lined with wool	2 00
	2d do	1 00
8	Over coat, best gentleman's	4 00
	2d do	2 00
9	Pantaloons, best	3 00
	2d do	2 00
10	Silk hat, best	3 00
	2d do	2 00
11	Extra Entries.	

CLASS XXXV.—INDIAN PRIZES.

1	Basket, best fruit	2 00
	2d do	1 00
2	Basket, best clothes	2 00
	2d do	1 00
3	Basket, best hand	2 00
	2d do	1 00
4	Buckskin mittens, best pair of	2 00
	2d do	1 00
5	Canoe, best bark	4 00
	2d do	2 00
6	Cradle, best Indian	3 00
	2d do	2 00
7	Deer skin, best dressed	2 00
	2d do	1 00
8	Moccasins [plain] best pair of	2 00
	2d do	1 00
9	Moccasins worked with porcupine quills, best pair of	3 00
10	Mocasins, worked with beads, best	2 00
	2d do	2 00
	pair of	3 00
	2d do	2 00
11	Paddles, best 4	3 00
	2d do	2 00
12	Pipe of peace, best	3 00
	2d do	2 00
13	Pipe of war, best	3 00
	2d do	2 00
14	Rice, 14 lbs, best sample of	2 00
	2d do	2 00

Sect.	$	c.
15 Snow shoes—common size, best pair of	3	00
2d do	2	00
16 Snow shoes, eight inches long, best pair of	2	00
2d do	1	00
17 Sugar, 14 lbs, best sample of	3	00
2d do	2	00
18 Tobacco Pouch, best, worked with porcupine quills	1	00
19. Extras.		

CLASS XXXVI.—LEATHER, WHIPS, INDIA RUBBER, &C.

1. Boots, best specimens of Gentlemen's	4	00
2d do	2	00
2 Boots, best specimen of ladies	4	00
2d do	2	00
3 Boot maker's trees and lasts, best collection of	5	00
2d do	3	00
4 Harness, double, best set of carriage	7	00
2d do	5	00
5. Harness, single, best set of carriage	6	00
2d do	4	00
6 Harness, best set of team	5	00
2d do	3	00
7 Harness, best set of cart	4	00
2d do	2	00
8 Hames, iron cased, best 3 pairs of	5	00
2d do	3	00
9 Hames, wooden cased, best six pairs of	5	00
2d do	3	00
10 Hose and joints, best 50 feet of copper riveted [$2\frac{3}{4}$ inches in diameter] engine	6	00
2d do	4	00
11 Indian rubber goods, best assortment of	8	00
12 Leather:		
a Hog skins for saddles, best 3	4	00
2d do	3	00
b Skirting for saddles, best 3 sides of	4	00
2d do	3	00
c Brown strap, best 3 sides of	4	00
2d do	2	00
d Brown bridle, best 3 sides of	4	00
2d do	2	00
e Harness, best 3 sides of	4	00
2d do	2	00
f Carriage covers, best 2 skins for	4	00
2d do	2	00
g Sole, best 3 sides of	4	00
2d do	2	00
h Upper, best 3 sides of	4	00
2d do	2	00
i Kip skin, best 3 sides	4	00
2d do	2	00
j Cordovan, best 3 skins of,	4	00
2d do	2	00
k Linings, best six skins of	4	00
2d do	2	00
l Calf skin, best three skins of	4	00
2d do	2	00
m Sheep skins, best six coloured	4	00
2d do	2	00
n Calf skins, best 3 morocco	4	00
2d do	2	00
o Patent Leather for carriage or harness work, best 20 feet of	6	00
2d do	4	00
p Patent leather for bootmakers, best 20 feet of	6	00
2d do	4	00
q Book binder's leather, best assortment of	6	00
2d do	4	00
r Belt leather, best 30 lbs of	4	00
2d do	2	00
s Lacing leather, best hide of	2	00
t Deer skin, best dressed	2	00
u Dog skin, best dressed	2	00
13. Portmanteau, best travelling	6	00
2d do	4	00
14. Saddle, best ladies'	6	00
2d do	4	00
15 Saddle, best gentleman's	6	00
2d do	4	00
16 Saddle tree, best ladies'	4	00
2d do	2	00
17 Saddle tree, best gentleman's	4	00
2d do	2	00
18 Saddle tree, best cart	2	00
2d do	1	00
19 Shoe Pegs, best assortment of	3	00
2d do	2	00
20 Trunk, [covered with leather] best wood	4	00
2d do	3	00
21 Whips, [collection assorted] best specimens of	6	00
2d do	4	00
22 Whip thongs, best assortment of	3	00
2d do	2	00
23 Extra Entries.		

CLASS XXXVII.—LADIES' DEPARTMENT.

1 Bonnet of Canadian straw, best	4	00
2d do	3	00
2 Braiding, best specimen of	4	00
2d do	3	00
3 Crochet work, best specimen of	4	00
2d do	3	00
4 Embroidery in muslin, best specimen of	4	00
2d do	3	00
5 Embroidery in silk, best specimen	4	00
2d do	3	00
6 Embroidery in worsted, best specimen of	4	00
2d do	3	00
7 Gloves, best three pairs of	3	00
2d do	2	00
8 Guipure work, best specimen of.	4	00
2d do	3	00
9 Hat of Canadian straw, best	4	00
2d do	3	00
10 Knitting, best specimen of fancy	4	00
2d do	3	00
11 Lace work, best specimen of	4	00
2d do	3	00
12 Mittens, best 3 pairs of woollen	3	00
2d do	2	00

Sect.		$ c.
13 Needle work, best specimen of ornamental		5 00
2d	do	3 00
14 Netting, best specimen of fancy		4 00
2d	do	3 00
15 Quilts in crochet, best specimen of		4 00
2d	do	3 00
16 Quilts, in knitting, best specimen of		4 00
2d	do	3 00
17 Quilts, in silk, best specimen of		4 00
2d	do	3 00
18 Quilts in piece work, best specimen of		4 00
2d	do	3 00
19 Shirts, best specimen of gentlemen's		3 00
2d	do	2 60
20 Socks, best 3 pairs of woollen		3 00
2d	do	2 00
21 Stockings, best 3 pair of woollen		3 00
2d	do	2 00
22 Tatting, best specimens of		4 00
2d	do	3 00
23 Wax fruit, best specimen of		6 00
2d	do	4 00
24 Wax flowers, best specimen of		6 00
2d	do	4 00
25 Worsted work, best specimen of		4 00
2d	do	3 00
26 Worsted work, [raised] best specimen of		4 00
2d	do	3 00
27 Extra Entries.		

CLASS XXXVIII.—MACHINERY, AND MANUFACTURES IN METALS.

1 Bedstead, best iron		5 00
2 Coppersmith's work, best specimen of		5 00
3 Cut Nails, best 20 lbs of		5 00
2d	do	3 00
4 Fire arms, best collection of		8 00
5 Files, best collection of cast steel		3 00
6 Finishing in iron, [vice work] best specimen of		3 00
7 Gas Fittings, best collection of		8 00
2d	do	5 00
8 Horse shoes, best set of		3 00
2d	do	2 00
9 Iron fencing and gate, best ornamental		8 00
10 Iron work from the hammer, best ornamental		5 00
11 Iron work, cast, best ornamental		4 00
12 Iron fire-proof safe, best [price considered]		5 00
13 Iron fire-proof vault door, best [price considered]		5 00
14 Locksmith's work, best specimen of		6 00
15 Machinery and models thereof:		
a Castings for general machinery, best specimen of Iron		6 00
b Cast wheel spur or bevel, best [not less than 50 lbs weight]		4 00
c Fire engine, best		15 00
d Engine, [general millwright's work or machinery], best model in metal of		8 00
2d	do	5 00
e Steam engine, 4 to 6 horse power, [open to foreign competition] best portable		3 00
f Steam engine in operation on the ground, best		40 00
g Valves and gearing for working steam expansively, either in model or otherwise, [principle of working to be the point of competition] best specimen of		12 00
16 Malleable iron from the ore, best specimen of		6 00
17 do from scrap iron, best specimen of		6 00
18 Plumber's work, best specimen of.		6 00
19 Pump, best metal		4 00
20 Railway casting &c:		
a Car truck worked to a scale, best model of a		6 00
b Car coupler, best self acting		12 00
2d	do	8 00
c Cast jaws and boxes for cars, best two		3 00
d Composition boxes for cars, best two		3 00
e Car castings, best and largest assortment of		10 00
f Locomotive truck wheels, best [accompanied with specimens of the metal chilled and showing the fracture]		6 00
g Passenger car wheels, best do do		6 00
21 Refrigerator, best [price considered]		4 00
22 Scales, best platform		4 00
2d	do	3 00
23 Scales, best balance		3 00
2d	do	2 00
24 Hall stove, best		4 00
2d	do	2 00
25 Parlour stove, best		4 00
2d	do	2 00
26 Cooking stove with furniture, best		5 00
2d	do	3 00
27 Cooking stove for coal, best		5 00
2d	do	3 00
28 Parlour grate, best		5 00
2d	do	3 00
29 Kitchen range, best		6 00
30 Street hydrant, best model of a		4 00
31 Tinsmith's work, best specimen of		5 00
32 Tools:		
a Augers, from ½ to 2 inches, best		3 00
b Auger, best earth		3 00
c Axes, best six narrow		4
2d	do	
d Brace bits, best set of		4 00
e Bench planes, best set of		4 00
f Blacksmith's bellows, best		4 00
g Cooper's tools, best set of		4 00
h Edge tools, best assortment		4 00
i Hammers, best collection of		20 00
j Moulding planes and collection of		4 00
k Weavers reeds, best plows, best		4 00
2d	do	2 00
33 Turning in iron		1 00
2d		4 00
best specimen of		3 00
do		

Sect.		$ c.
34	Wire work, best collection of specimen of	6 00
	2d do	4 00
35	Wire ropes, best specimens of	4 00
36	Extra Entries.	

CLASS XXXIX.—MISCELLANEOUS.

1	Brushes, best assortment of	4 00
	2d do	2 00
2	Combs, best assortment of	4 00
	2d do	2 00
3	Dentistry, best specimen of	6 00
	2d do	4 00
4	Goldsmith's work, best specimen of	6 00
	2d do	4 00
5	Mathematical, Philosophical and surveyor's instruments, best collection of	8 00
6	Painting, best specimen of decorative house	6 00
	2d do	4 00
7	Painting, imitation of wood and marble, best specimen of	6 00
	2d do	4 00
8	Picture frame, best gilt	6 00
	2d do	4 00
9	Picture frame, best veneered	6 00
	2d do	4 00
10	Silversmith's work, best specimen of	6 00
	2d do	4 00
11	Stuffed birds, best collection of	6 00
	2d do	4 00
12	Varnishes, Canadian made, best specimen of	4 00
	2d do	3 00
13	Vessel, steam or sailing, best model of a	5 00
	2d do	3 00
14	Extra Entries.	

CLASS XL.—MUSICAL INSTRUMENTS.

1	Harmonium, best	10 00
	2d do	6 00
2	Melodeon, best	6 00
	2d do	4 00
3	Piano, best	15 00
	2d do	10 00
4	Violin, best	3 00
	2d do	2 00
5	Extra Entries.	

CLASS XLI.—POTTERY, BUILDING STONES, &C.

1	Building and flagging stones, best collection of Canadian	20 00
2	Draining tiles and pipes, best specimens of different sized	8 00
	2d do	5 00
3	Filterer, best water	3 00
	2d do	2 00
4	Pottery, best specimen of	4 00
	2d do	3 00
5	Pottery, best assortment of	8 00
6	Extra Entries.	

CLASS XLII.—PAPER, PRINTING, BOOKBINDING &C.

1	Book binding, blank book, best specimen of	5 00
	2d do	3 00
2	Bookbinding, letter press, best specimen of ornamental	5 00
	2d do	3 00
3	Cartridge paper, best specimen of	2 00
4	Ink, best specimen of printing	2 00
5	Ink, best specimen of writing	2 00
6	Letter-press printing, best specimen of plain	5 00
	2d do	3 00
7	Letter-press printing, best ornamental	5 00
	2d do	3 00
8	Printing paper, best ream of	5 00
	2d do	3 00
9	Paper hangings, grounded, best doz. rolls [on Canadian paper]	6 00
10	Paper hangings, self grounded, best doz. rolls [on Canadian paper]	4 00
11	Type, best specimen of printing	6 00
12	Writing paper, best ream of	5 00
	2d do	3 00
13	Wrapping paper, best and cheapest ream of	4 00
	2d do	3 00
14	Wrapping paper, best specimen of stout	3 00
	2d do	2 00
15	Wrapping paper, best specimen of fine	3 00
	2d do	2 00
16	Extra Entries.	

CLASS XLIII.—WOOLLEN, FLAX, AND COTTON GOODS.

Sect.		$ c.
1	Bags, manufactured from flax the growth of Canada, best 12 linen	5 00
	2d do	3 00
2	Bags, best 12 cotton	4 00
	2d do	2 00
3	Blankets, best pair of woollen	8 00
	2d do	6 00
4	Carpet, 12 yards, best piece of woollen	8 00
	2d do	6 00
5	Carpet, 12 yards, best piece of woollen stair	6 00
6	Cloth, 12 yards, best piece of fulled	6 00
	2d do	4 00
7	Cloth, Canadian wool, best piece of broad	8 00
	2d do	5 00
8	Counterpanes, best two	5 00
	2d do	3 00
9	Cordage, 28 lbs, best flax or hemp	6 00
	2d do	4 00
10	Drawers, factory made, best pair of woollen	4 00
	2d do	3 00
11	Flannel, factory made, best 12 yards	6 00
	2d do	4 00
12	Flannel, not factory made, best piece of [12 yards]	5 00
	2d do	3 00
13	Horse blankets, best 2 pairs of	5 00
	2d do	3 00

Sect.		$	c.
14	Horse clothing, best 12 yards of Kersey for	6	00
	2d do	4	00
15	Horse collars, best 12 yards of check for	5	00
	2d do	3	00
16	Linen goods, best piece of	5	00
	2d do	3	00
17	Oil cloth, best 12 yards of	4	00
	2d do	3	00
18	Satinet, best 12 yards of	6	00
	2d do	4	00
19	Shawls, best 3	5	00
	2d do	3	00
20	Shirts, factory made, best 6 woollen	5	00
	2d do	3	00
21	Stockings, factory made, best 3 pairs of knitted woollen	4	00
22	Socks, factory made, best 3 pairs of knitted woollen	2	00
23	Stockings, factory made, best 3 pairs of mixed woollen and cotton.	4	00
24	Socks, factory made, best 3 pairs of mixed woollen and cotton	2	00
25	Tweed, best 12 yards of winter	4	00
	2d do	4	00
26	Twines, linen and cotton, best samples of	3	00
27	Minsey, best 12 yards of checked	5	00
	2d do	3	00
28	Woollen yarn, white, best 1 pound of	2	00
29	Woollen yarn, dyed, do do	2	00
30	Extra Entries.		

PRIZE ESSAYS.

THE BOARD OF AGRICULTURE OFFERS Premiums for Essays upon the following subjects:

1st. For the Best Essay illustrating the Practical Adaptation and Money Value of Science to the Canadian Farmer, $60; second best, $40.

2d For the Best Essay on Practical Agriculture, showing to what extent improved systems of Husbandry may be introduced into this Province with profit and advantage—to be written by a practical farmer—$60; second best, $40.

3rd For the Best Essay on Fruit Culture, illustrating the best and most certain method of raising the finer grafted fruits, tracing the causes of the losses of fruit sustained in some Districts, and showing what kinds can be grown with success—the Essay to be founded upon a practical knowledge of facts—$60: second best, $40.

The competitors for the above Essays to be residents of Canada. The Essays to be sent to the Secretary of the Board of Agriculture, on or before the 1st of September next, in order that their merit may be decided upon in time to be announced at the Annual Show.

GEORGE BUCKLAND,
Secretary Board of Agriculture.

PRIZES FOR ESSAYS ON MANUFACTURES OF UPPER CANADA.

THE "Board of Arts and Manufactures for Upper Canada," hereby offer a first Prize of One Hundred Dollars, and a second Prize of Fifty Dollars for the first and second best essay upon the

PRESENT MANUFACTURES OF UPPER CANADA

The Essay to be accompanied by an enclosure containing the writer's name and address, and having a mark or seal on the outside corresponding with a similar mark or seal on the Essays, and to be sent in under cover to the Secretary of the Board of Arts, &c., at least ten days prior to the Provincial Exhibition for the present year, 1858, at which time the award of the Judges—who are to be appointed by the Sub-Committee—shall be declared, in such manner as the said Sub-Committee may previously determine.

The Essays will be expected to give an account of the existing Manufactures in Upper Canada, and their state of prosperity, with suggestions for their extension and improvement.

No Prizes will be awarded unless the Essays are considered worthy by the Judges.

W. EDWARDS,
Secretary B. A. & M.

Prince Edwards Island.—The guarantee by the British Government of a loan of £100,000 to this Colony, at a rate of interest not exceeding 4 per cent. per annum, is hailed as a great boon, as it will enable the local government to purchase the fee simple of a large quantity of land held by absent proprietors, and thus open it to actual settlers. In 1767 the greater portion of the Island was disposed of by lottery, the tickets being distributed among officers of the Army and Navy, who had served in the preceding war, and other persons who had claims upon the Imperial Government. The land was granted upon certain conditions. The proprietors were obliged to introduce one settler for every 100 acres, and to pay a quit rent varying from 2s. to 2s. 6d. per annum. The terms, however, were never enforced, and in 1830 the quit rent was abandoned altogether, and a land tax substituted. It was found that the large tracts held by non-residents shut up the Island to actual settlers, and retarded its prosperity. The object of the loan is to buy back the land and dispose of it in small lots for settlement.—*Halifax Paper.*

THE

Canadian Agriculturist,

AND

JOURNAL OF THE BOARD OF AGRICULTURE

OF UPPER CANADA.

VOL. IX. TORONTO, JULY, 1858. No. 7.

THE PROVINCIAL EXHIBITION.

The arrangements for this great gathering in Toronto are fast approaching completion. The CRYSTAL PALACE is finished, and the fittings up are actively proceeding with. All that now remains to look for is an adequate response from the country, by means of visitors, stock, and material, which it is believed the result will justify. The Show will commence on the 28th September, and terminate, so far as the Live Stock is concerned, on the 1st of October. But it has been determined by the Board of Agriculture to keep open the CRYSTAL PALACE an additional week, in order to give the public ample opportunity of carefully inspecting the numerous productions of Canadian ingenuity and skill, with which the capacious building will abound. Exhibitors therefore are requested to leave such non-perishable articles as they can conveniently, for another week. This arrangement will, it is hoped, prevent the usual over-crowding for a day or two, annually complained of, and afford ample opportunity for our manufacturers, mechanics, and artists, to bring their productions in a favorable manner before the public. The Managers of the Grand Trunk Railway have engaged to take visitors, stock, and articles to and from the Exhibition, for half the usual rates, as long as the show is kept open. The Local Committee have also ascertained that the Great Western and Northern Railways will carry at half rates, as also the Steamboats.

WEEDS.

A correspondent states that his ground is much infested with the Burdock, and requests us to give some information on the most effectual means of accomplishing its eradication.

The common Burdock (*Arctium Lappa*) belongs to a class of plants which has generally been regarded by farmers as indicating fertility of soil, where they

naturally prevail. The Burdock is a biennial plant, with a long thick root, which was formerly much used in medicine. In the case of a piece of ground occupied in the main by this weed, a good plan would be to cut off the stems early in the summer, and plough deeply so as to break up the roots, which can readily be brought to the surface and destroyed by a cultivator. By giving the land a clear and deep summer fallow, this pest may readily be got rid of. In case single plants should afterwards spring up, they can, when the ground is moist, be pulled up by the root, in a similar manner to docks and other deep-rooted plants. If the Burdock is not allowed to flower, and its stem cut off near the surface, it must soon perish.

The principal thing a farmer has to do, after getting his land into a clean state of cultivation, is to keep it in that condition,—a matter not very easily accomplished in practice, especially in this climate where annual weeds are so numerous, prolific, and of so remarkably quick growth. For ordinary purposes weeds may be divided into two classes,—those propagated by seed, and others by the root. The former are called annuals or biennials; the latter perennials. The annuals are often found in practice by no means so readily extirpated as the fact of their lasting only one year might lead us to suppose. The seeds of this class are so numerous, and distributed in various ways by different means, that the most vigilant attention of the farmer is constantly required. Winds and birds are the chief agents in their distribution. Hence, the necessity of a whole neighborhood being vigilant in regard to this important matter. One slovenly farmer will in time stock with weeds the clean and well cultivated fields of his neighbors. Perhaps, after all, the most prolific source of weeds is to be sought in the grain and grasses that are usually sown, and the barn manure with which we dress our fields. In this country (and the same remark will equally apply to several countries in Europe), a clear sample of seed grain or grasses is seldom to be procured. Farmers sow the seeds of weeds more or less with every crop they cultivate;—no wonder, then, that we hear such constant complaints of the difficulty and expense of keeping land even tolerably clean. Nothing will effectually accomplish that most desirable object but the employment of *pure seed*, especially if sown in drills, and thoroughly fermented manure.

Professor Buckman, of England, has recently made some careful investigations of these matters, and we will state a few of the results obtained, as they cannot fail, we think, to interest our readers. The Professor found "in a pint of clover-seed 7,600 weed-seeds; in a pint of cow-grass seed, 12,600; in broad clover, 39,440; and two pints of Dutch clover yielded severally 25,560 and 70,400 weed-seeds. Supposing these samples to be sown, here were seeds enough to stock the land with weeds for many years. The farmer often goes to the cheapest market and gets weeds for corn, and so pays exceedingly dear for what he considers a cheap bargain." If this be true, in relation to English farming, how much more so must it be to American, when it is well known much

less pains is taken in preparing grain for market, as well as in the selection of seed and the general cultivation of the soil. In purchasing seed grain, turnip-seed, the grasses, &c., farmers often display a want of judgment and ordinary prudence, by selecting such articles as are cheap, or rather low-priced, for that is not really cheap which is not genuine; and we can conceive no greater pest in an agricultural neighborhood, than "*a cheap seed store*," in the but too common acceptation of the term.

The fecundity of some weeds is truly astonishing. Professor Buckman has counted 8,000 seeds in a single plant of black mustard, and in a specimen of charlock 4,000 seeds. The common stinking camomile produces 46,000, and the burdock 26,000 seeds; and the seeds of a single plant of the common dock produced 1,700 little docks.

A fruitful source of weeds may often be found in rough, undecomposed barn yard manure. Not only should fermentation in some degree be allowed in the dung heap, in order to effect the necessary decomposition and moisture of its several materials, but great care should be taken that weeds, the seeds of which have become matured, should not be mixed either with the litter of the farm yard or be allowed to enter the compost. Weeds mown thus ripe had much better be burnt; but the proper time for cutting them is before they get into flower, thus obviating the heavy demands which all plants make in maturing their seeds, and of course preventing all chances of propagation. With perennials and such weeds as increase by roots, the only sure and speedy way of extinction is deep and clean cultivation. A well-made, naked fallow, on heavy lands once in five or six years, is even now, in the most advanced agricultural countries, had recourse to for sweetening and clearing the soil, and for bringing it into a perfect mechanical and chemical condition for the profitable growth of crops. This occasional practice, with the introduction of new crops and consequent horse-hoeing tillage during the period of growth, as far as present circumstances will allow, together with a judicious system of rotation and manuring, appears from all experience to be the only sure and profitable way of raising heavy crops of pure quality, and of *preventing*, which is much better and cheaper than *curing*, the growth of weeds.

PULPING FOOD FOR CATTLE.

The changes that have taken place in the mode of feeding live stock within the last thirty or forty years are very instructive; indicating in the most unmistakable manner the progress of science—more particularly chemistry and animal physiology—in its applications to practical agriculture. The old practice of feeding cattle upon uncut hay and straw, and unbruised grain, has for some years been displaced by a far more rational and economical system. The chaff cutter, many years since, taught the farmer that a mixture of hay and straw cut into short lengths, was far better for horses than when these materials were sup-

plied in the form in which they came from the field. Bruised oats, and other grain, were subsequently found to be better adapted to animals than when whole. Hence the various inventions for cracking or bruising grain by machines of different sizes, adapted to hand, horse or steam power. Of late years experience —the result of the most carefully conducted experiments—has clearly shown that all kinds of cattle-food, hay, straw, grain, and roots, are more nutritious, weight for weight, when finely divided and thoroughly cooked, by the simple process of steaming. The proper relative quantities of raw and cooked food is a matter upon which experience has not yet absolutely decided. A certain proportion of food thus prepared has indisputably been shown to be highly advantageous, not only to horses but also to cattle, sheep and pigs. The boiling of linseed with chopped hay, straw, turnips, &c., till reduced to a sort of jelly, has been practised for years by the best farmers in Britain, for the fattening of cattle, and the practice has been found both efficient and economical.

It is true that the rationale of pratices of this nature involves some of the most difficult questions in vital chemistry and animal physiology; and it cannot but be satisfactory to know that the more recent researches and progress made in these sciences, tend to illustrate and confirm the improved systems of breeding and feeding the domesticated animals. It would appear that the advantages of the system of finely dividing, and even cooking, the food of animals mainly consists in diminishing the force necessary for perfect mastication; thereby rendering digestion more rapid and easy, and the material principles of the food thus become more thoroughly absorbed into the animal system. It has been clearly shown that food remains in the stomach only for a certain time when it is subjected to that powerful solvent, the gastric juice; it is afterwards passed into the intestines when only the thoroughly digested portions are, by the process of absorbtion, converted into blood and muscle.

Refinements in cattle feeding have been carried still further within the last year or two by the invention of what is termed the "Pulping Machine," which has been in use by several farmers in the old country, and we infer from the accounts that have reached us, with much satisfaction. Several of these machines were exhibited at the recent English Show at Chester, when they were subjected to a searching trial. Hitherto it has been deemed sufficient to cut roots into slices more or less fine, according to the kind of animals to be fed By reducing however the roots into a pulp, not only is the force of mastication reduced to a minimum, but the greatest possible surface of the material is without loss of time, brought into direct contact with the gastric juice.

It may, however, in the present state of our knowledge, fairly admit of a doubt whether there is not a risk of carrying the practice of pulping and cooking food too far. A certain amount of mastication must necessarily be performed by the animals, for which purpose nature has furnished it with teeth; the pulping machine, therefore, should be regared only as an auxiliary. According to Liebig the chief use of saliva is to absorb the oxygen of the air, which

thus becomes mixed with the food and carried into the stomach, when a still further reduction is effected. Mastication, therefore, not only breaks down the food, but enables the gastric fluid to mix with it the necessary amount of oxygen, that it may be taken up by the absorbents and converted into animal tissue. In giving dry food, such as hay or straw to animals, practice has decided that such as chew the cud—the cow and sheep for example—should have it cut courser than the horse, which is a non-ruminant. This act of rumination would appear to be useful, not only by subjecting the food to a second mastication, but also enables it to obtain more oxygen from the air inhaled by respiration.

It may be well further to observe that although experience has already fully proved that the cooking of cattle food, and we may add, perhaps, the pulping of roots, is an advantageous practice, yet it must not be forgotton that the same experience promotes the necessity of giving daily to animals thus fed a certain quantity of dry fodder such as hay or straw in their usual state. This corrects, as the farmers say, the laxity which a large amount of unmixed succulent food usually produces in the bowels of animals. Indeed, *bulk* has to be considered in regard to food and nutrition as well as quality. The stomach requires a certain amount of food, and no animal will thrive or indeed live for any great length of time or any amount of the essence of food with which it may be supplied. There is much of a curious scientific nature yet to be learnt in these matters, that will be made to have a most beneficial application to practice. And there are few questions possessing a greater money value to Canadians farmers than how to convert in the most effective and economical manner their hay, straw, grain and roots into thriving animals, and flavoury and nutritious meat.

SHOW OF THE ROYAL AGRICULTURAL SOCIETY OF ENGLAND AT CHESTER.

We have been favoured with the following description of this recent national gathering by a young Canadian visitor, who had just arrived in England :—

MANCHESTER, July 27th, 1858.

* * * On Thursday, July 22nd, I went to the Royal Agricultural Society's Show at Chester. I was highly delighted with what I saw; it being the largest and finest show I ever witnessed. Our Provincial Exhibitions in Upper Canada have of late years become very extensive and attended by multitudes of people, but there is this great difference between our shows and those of England, the latter being exclusively confined to live stock and agricultural implements, the usual productions of the farm even not finding a place. In England the division of labour is carried out through all pursuits; manufactures, horticulture, fine arts, &c., has each its separate organization. It will be so in Canada as her resources become developed, and her material and social progress of late years will favourably compare with any country in the world, not even excepting, perhaps, our dear old father land. The country around Chester looks rich and beautiful, and has the appearance of garden-cultivation

It will be a long time before the Canadian landscape can equal it. I can call to recollection, however, several spots in Canada that would look very like England, if they had only those picturesque attractions—green and living fences. Although I am gratified to an indescribable degree with the beauty, richness, and loveliness of the country, I cannot say so much of what little I have yet seen of the cities. In Manchester I was particularly struck with the unseemly conduct of great numbers of people on the Sunday—that sacred day of rest, emphatically the poor man's day. There are all kinds of games going on in back streets and open places; bar-rooms open, people fighting, a continued noise like any other day, and in fact several shops are open. I never knew till I came to Manchester, what life is in a large manufacturing city; a most marked mixture of good and evil. I have already availed myself of the former to some small extent by visiting the Museum of Natural History. The geological department is exceedingly rich, especially in fossil specimens belonging to the carboniferous group. The Horticultural Gardens are a great source of attraction. But I am leaving the object with which I commenced,—a few words about the great show at Chester.

I was, unfortunately, not present at the trial of machines and implements, which occupied two or three days at the beginning of the week. It was understood that the testing was never before conducted in so careful, searching, and scientific a manner, and the report of the committee of this department will be more than usually interesting and instructive. I devoted the Thursday to the inspection of stock, and Friday to the implements and machines; a portion of Saturday I gave to visiting some of the principal points of attraction of the city and its vicinity.

The ancient and usually quiet city of Chester, during the week of the great national show, was the scene of bustle and gaiety. The streets were thronged with visitors, and the royal standard of England, the eagles of France and of Prussia, as well as the banners of other nations, waved proudly and majestically on the ancient walls of this loyal city. The visitor, on entering the city from the railway station, is first attracted by the appearance of a beautifully decorated arch, covered with the laurel, and adorned with banners, bearing the inscription, "Welcome to Chester." In passing from this archway, which so nobly spans the street, to the show ground, the stranger cannot but admire the gaiety of the scene, and the citizens of Chester are deserving of great praise for the enthusiasm which they displayed on this very interesting and important occasion. The show was held in an enclosure called the Rooder, comprising, I should suppose, about thirty-five acres. This piece of land is set apart for the Chester Races, and has a level and beautiful surface. It was in an early period of the nation the arena for the sports of the Roman soldiers, and it is a very curious fact, that the very field which was once covered with the Roman army, and was the play-ground of the ancient Roman games, should now be covered with improved breeds of cattle and agricultural implements, of the latest mechanical improvements.

The general show yard of live stock and implements was opened to the public on Thursday; on the preceding days none but officials, judges, exhibitors, &c., were admitted. Upon paying a fee, however, visitors were allowed to witness the testing of the implements and machinery. From all I could learn, it may be safely affirmed that upon no former occasion was the display of horses, cattle, sheep, pigs, poultry, and implements, so large, or so deserving of praise, as upon the present occasion; and from this it may justly be inferred that British agriculture has made a grand step forward, both in theory and practice. I am inclined to think, however, that the agriculture and stock raising of Canada, during the existence of the Provincial Association,—some ten or twelve years,

I believe,—have made equal, if not greater, progress. This will be apparent when their very backward condition at the beginning of that period is duly considered.

The short-horn cattle were numerously represented, and among them some exceedingly fine specimens, possessing the most essential points and qualities constituting the present state of perfection of this world-renowned breed.—There were some first rate animals of this class at our Provincial shows; but here the vast number possessing superior merit, and evincing the most scientific breeding, was truly astonishing. As a proof that this extensive breed of cattle has not yet arrived at the *ne plus ultra* of perfection, it may be mentioned that some of the most celebrated short-horn breeders who carried off the first premiums of late years,—such as Colonel Towneley, for instance,—had to submit to a subordinate position on this occasion. So severe was the competition in bulls, that the brother of his celebrated "Master Butterfly," apparently a beautiful animal, obtained only a commendation. It is a fact worth recording, that of the twelve prizes offered by the local committee for the best dairy cows of any breed, *no less than eleven were won by Durhams!* I mention this as worthy of notice, since, judging from a controversy carried on in the pages of the *Agriculturist*, a year or two since, the short-horns, however excellent otherwise, were not generally regarded as good milkers.

The show of Herefords was generally admirable; the number and quality, I was informed, being both superior to former occasions. Some of them appeared too fat for breeding stock. This is, indeed, a beautiful breed, scarcely known, I believe, as yet, in Canada.

The class of Devons was inferior in point of numbers, but among them were specimens, the equals of which are rarely to be met with. And it will not be too much to say, that in them may be seen animals which were an ornament to the show, as well as to the homesteads to which they belonged. Among these splendid animals was a bull, one year and nine months old, exhibited by His Royal Highness the Prince Consort, which was very much admired. The Prince was a competitor in several classes.

Among the other classes of cattle, such as the Angus, West Highland, Alderney, &c., there were some apparently good specimens; but the Welsh breeds occupied the most conspicuous position, owing to Chester being in close proximity to the Principality. Colonel Pennant's herd showed what can be done for these black cattle of the mountains, so superior in point of size and symmetry to the ordinary Welsh "Runts," as they are called. The number of distinct breeds in the British Isles must be very considerable, and the living forms of several varieties not known on the western side of the Atlantic, strongly reminded me of the striking portraits of British cattle used to illustrate the Agricultural lectures in Univerity College at Toronto.

The display of horses was not considered upon the whole to be equal to that of cattle, and was confined chiefly to animals for draught; some of the dray horses being of immense size and power. The Suffolks and Clydesdales were well represented by some first rate specimens, and seemed to attract the popular approval. It would be difficult, I think, to excel the former for general farm work, and they would well repay a more extensive trial by Canadian farmers. I observed some really good hacks and roadsters, but saw nothing of carriage horses, and doubt whether any were on the ground.

In sheep the show scarcely came up to my very high expectations, although the display was great, and contained numerous animals the like of which I had never seen before. Mr. Jonas Webb, the celebrated breeder of Southdowns, and others in the department of Leicesters, did not exhibit; but the Duke of Richmond, and Mr. Rigden, of Sussex, had some beautifully bred Downs

The Cotswolds, however, were there in great numbers, and gave a decided character to this department of the show. I heard opinions expressed more than once that the Leicesters are declining. The Cotswolds, I think, are destined to attract some attention in Canada and the northern states. The Shropshires were numerously represented, and had many fine animals; they are said to have resulted from crossing with the black-faced sheep of the neighboring Welsh hills. Pigs were extremely numerous, and some of the young sows of the smaller breeds in particular, were perfect beauties. I observed some black Berkshires, spotted with white, but the white colour is decidedly in the ascendant. In this, as well as in the other departments of live stock, there is most satisfactory evidence, when compared with former times, that the farmer has not been backward in keeping pace with the general onward movements of the age. Perhaps at an Exhibition open to the whole kingdom, the collection of poultry was not so large as might reasonably have been expected, but the quality more than compensated for the deficiency in quantity; most of the specimens of the respective breeds were apparently perfect, and elicited general admiration.

The show of implements and machines exceeded my most sanguine expectations, not only in their amount, but likewise in the exquisite finish and great durability of the articles themselves. The price is higher than for American implements of a similar kind; but for efficiency in effecting deep and thorough culture, and durability, no comparison can be instituted. To go into the slightest description of what I was enabled to inspect would be quite impossible in a single letter; so extensive was this department that I could scarcely examine with any care a tenth of the various productions. The steam ploughs and cultivators, of which there were probably a dozen, naturally attracted a large share of the attention and curiosity of the visitors. Those of Messrs. Boydell, Fowler, Smith, and Ricket, appeared upon a practical trial to be the most advanced, and therefore promise best for an introduction to the practical work of the farm.—Not having seen any of them in operation, I can only say that many unprejudiced practical farmers, who had watched their operations with the most assiduous attention, expressed an opinion that it would be a long time yet before they could generally supersede the ordinary plough drawn by horses. Boydell's tractive engine, with its various apparatus, is of immense size and weight, and requires some seven or eight strong horses to move it from place to place. Its power is sufficient to move any implements that may be attached to it,—ploughing at once four or five furrows six or seven inches deep, without difficulty. Fowler's plough is much smaller and compact, and, it is said, makes much better work. The cost of these machines, in the first instance, their unwieldiness, liability to break, the number of skilled workmen required to manage them, and, as yet, the inferior work they make, compared to a skilful ploughman in the ordinary way, all tend against their coming, for a considerable time at least, into general use. The history of mechanical improvement of late, encourages us to hope that the time may come when they will be so far advanced and adapted to practical purposes, that upon all large farms, with suitable fields and surface, they will be generally and economically employed. The amount of portable steam engines for farm purposes, ploughs, harrows, horse hoes, scarifiers, chaff-cutters, drills, &c., &c., was immense, the practical examination of which might well occupy the most advanced farmer and machinist several days. Some new things I could not fully understand. One class of machinery was exceedingly interesting, by means of which grain can be taken in the straw direct from the stack, and at once converted into bread.

G. W. B.

CHESTER MEETING OF THE ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

The following statements and calculations relative to the testing of the implements and machines at the Chester meeting, abridged from the *Farmer's Journal* and *Mark Lane Express*, will well repay a careful perusal. It appears that the society subjects the implements &c., brought forward for competition to the most careful and rigid testing every third year. On this recent occasion the trial was continued for an entire week, and seems to have commanded the confidence of both exhibitors and the public:

STEAM CULTIVATION.

Cultivation by steam has made but little progress since last year at the Salisbury Show. Messrs. Smith and Fowler occupy the same relative positions as heretofore, and the other inventors, with one exception, appear to have merged their inventions in others, or kept them for a time in abeyance.

The general opinion amongst all practical farmers, many of whom had come from great distances to look at the steam-ploughing, was, that something more compact was wanted than anything exhibited in the field. Ropes, tackle, windlasses, snatchblocks, anchors, &c., appeared to many of them to be too complicated, and threatening to be too costly, for effecting cultivation by steam, to really economical results. Eight horses, for instance, have to be employed for the removal of all Mr. Fowler's apparatus, and it takes several hours before the whole can be got into working order. Again, it requires four men and a boy to attend the apparatus properly, and even that number is scarcely enough, for to underman machinery of any kind is anything but economical; and these men ought to be intelligent men, much more so indeed than can be expected, as a general rule, to be found in our agricultural districts. It may, however, be said that the man must be educated up to the machine; and if the latter prove itself an efficient and good working agent, there can be little difficulty in accomplishing this object. Many of the spectators also remarked that the friction of the ropes in wet weather must be enormous; and that, after all, the work done is comparatively inferior, that it is only ploughing indifferently, and that it does not accomplish spade husbandry, which we ought to look for when such a powerful element as steam is applied to the culture of the soil. These views were widely entertained, and, in many instances, openly expressed; nor were they the opinions of men who are the victims of perjudice, and who cling to their habits of ignorance and backwardness with a tenacity of purpose that nothing can relax; for the majority are employing machinery of the best description on their farms, and are desirous of adopting steam in ploughing, when they see their way pretty clearly upon the subject. We need scarcely remark that we have little sympathy with many of these opinions, and simply record them to show the precise phase of the question of cultivating by steam. We have great hopes that in a very short period a machine will be brought out which will have the effect of obviating the few difficulties that still impede the application of steam to the successful culture of the soil.

Messrs. Boydell, Fowler, Smith, and Rickett, were the several exhibitors of steam machinery as applied to cultivation. Mr. Boydell has the same monster engine as he had at Salisbury—wheels, pattens, pinions, &c., precisely the same; doing about the same work, dragging every possible implement after it, and turning angles occasionally that would puzzle an ordinary waggon drawn by horses. The following alterations, however, in Burrell's Boydell engine ought to be noticed, as they show that the first crude idea is being licked into shape by degrees, and possibly may become a standard practical machine. The gear-work for driving both carriage wheels, instead of only one, the new pinion and toothed quadrant steerage, instead of the old rudder-chain and pole, and pieces to be attached to the shoes, to guide them and give them a better hold on the ground. There is also an additional force pump, and an extra lifting pump with 30 feet of India-rubber suction-hose, for supplying the tender with water from roadside streams, or field ditches. The price of the Traction-Titan is £800 or £750 without these extra pumps. The power of Mr. Boydell is manifest; the application of that power is another question. Practical common sense must settle that question. Let us,

however, do justice to this singular invention, and bear testimony to its great traction power. On going out of the yard to the trial ground, the chain connecting the engine with the tender broke, which caused the latter to back with so great an impetus that it upset a van and horse just behind it, but without doing any great amount of injury to either. The engine, with all its apparatus, afterwards ascended a pitched road, with a gradient of one in six, and turned a sharp angle with as much ease as a donkey-cart would, though itself and its tender with water weighed upwards of 22 tons. It then tramped along the high road to a field about five miles distance from the yard, to the astonishment of those who had never seen it before, and the amazement also of several who had seen it upon many preceding occasions. Upon entering the field which was a rich alluvial soil and easily cut, a frame-work of six ploughs, each being independant by leverage action, were attached to the engine, and it turned over the six furrows with the greatest ease, but not with the regularity and working order that good ploughmen like to see. There was, consequently, the usual amount of criticism by the lookers-on, many of whom had never seen a machine of the kind before, and were apprehensive that their occupation like that of *Othello* would be gone were such iron labourers made practically applicable to the culture of the soil.

On another field where the trials took place, Mr. Boydell's iron baby exhibited more than its usual strength, and certainly did some work that has never been equalled in a single operation. With a couple of Cotgrove's subsoilers and two ordinary ploughs it turned up the soil to the depth of from 12 to 13 inches, completely disintegrating it, and leaving the land as though it had been dug by spade-work. The soil was exceedingly hard, and the strength required to break it up and turn it over must have been fully equal to 20 horses at least. Yet the monster engine did it with comparative ease, and created a feeling of astonishment amongst the spectators that is seldom seen, and which was promptly and openly expressed by most of them. With Coleman's eleven-prong cultivator, also, very good work was done, and the implement of whatever kind has only to penetrate the soil, and it is sure to be dragged through, however deep it may be, or however stiff and tenacious the soil. Upon the whole, while the spectators were astonished at the power of the engine, few could bring themselves to the idea of individually applying it in the culture of their farms. It seemed as though it had ran away from a railway station, and was desirous of taking a turn in the fields for the benefit of its health; and were a huge elephant put into a dog-cart, or any other light trap, it would have about the same non-apropos appearance as Boydell's engine has when attached to a plough, or to any other implement employed in the field.

Mr. Fowler's apparatus has undergone considerable change since last year, and is much simplified in its general action. In construction it appears about as sightly a thing as could possibly be desired, and as effective in its working powers as plough machinery, not worked by horse and hand, can be expected to be. A ten horse double cylinder portable engine, with a windlass to attach and detach, and anchor; and four furrow ploughs, with scarifier tines to take the place of the plough mould board, are the general features of the apparatus. The great length of rope which formerly added so much to the wear and tear, and to the loss of power in friction over so many pullies, has been considerably modified; nor was this the only drawback to the working power of the machine, for the rope was coiled layer over layer, requiring excessive labour to coil it well, which is now completely dispensed with. The rope now used is endless; and the labour of coiling and the risk of its overrunning itself in uncoiling is therefore at an end, and the quantity of rope used is reduced from one-third to one-half of that required by the old plan, either with a travelling or a fixed windlass. The same rope will also bear a much greater strain, as the pull on it is more equal and steady. The wear and tear is much diminished, and where the cartage is bad, two small engines, according to Mr. Fowler, can be used in combination to produce a large horse power, one being at each end of the field. The adjustment also to the length of any field is easily made, as the rope is in lengths and can be joined together, so that a field from 150 to 400 yards long can be worked with comparative facility. The ends of the rope are coiled on two small barrels on the plough, so that any variation required by the crookedness of a fence can be adjusted by the ploughman. The adaptation also of the plough-frame, heretofore used only as a plough, for a scarifier and broadshare, is a great improvement; and the making the discanchor self-moving in a more perfect manner than formerly is certainly another. The tackle consists of windlass, anchor, and plough, rope porters, and about 800 yards of rope, capable of working a 400-yard furrow. The windlasses are attached to the fire-box or smoke-box end of the engine, and

can be detached at pleasure. The whole is simple and light in appearance, and is constructed almost entirely of wrought iron.

Mr. Smith's (of Woolston) apparatus was about the same as we have seen it on former occasions. It consisted of an eight-horse portable engine, made by Clayton and Shuttleworth; a windlass upon a carriage exceedingly simple in its construction, made by Humpries, of Pershore; and anchors, pulleys, snatch blocks, and implements made by Messrs. Howard. The cultivator and scarifier of Mr. Smith, are well known to our readers, both three tined and five tined; and the method of working them by ropes may be thus briefly described. The anchors are iron frames, having strong curved tines, which are drawn into the ground by the strain of the pulleys hooked to them; and the windlass has two drums, with horizontal axles, hung side by side on separate bearings, in a timber frame, strongly constructed, and mounted on four travelling wheels. To keep it in a fixed position, the windlass is linked to the engine by a chain; and the whole is worked by a strap from the engine fly-wheel. In working, when the implement arrives at the headland, the steam is shut off; the pinion in the transverse shaft, being shifted sideways, is out of gear with the drum winding up the rope; and the other drum, which has been paying out rope, is then slipped into gear with it. The whole apparatus is exceedingly simple, and is easily worked. On the first occasion of trying it at Chester, a ridging body of Messrs. Howard was attached to the cultivator, which turned up some excellent work.

Mr. Rickett's rotatory steam cultivator is a new machine. It consists of a ten-horse locomotive engine, with a horizontal shaft behind, driven by pitch chains, and revolving in radial links in the direction contrary to that of the wheels. On the shaft, there are tines or cutters which enter the soil at the bottom of the furrow, cut upwards, and either break up or invert the soil. In one or two mechanical details we consider this machine defective; pitched chains do not work well, having too much friction. The rotatory digger is liable to clog, which brings the engine "up," or stops it; and the digger revolves in an opposite direction to the machine's forward course. The result is that all the cutting action of the digger on the soil has to be overcome by the propelling power of the engine; whereas if the digger revolved in an opposite direction, like a paddle-wheel, it would materially help the work to be done. There are also too many shafts, which crowd the action of the machine; the steering apparatus is likewise defective, which prevents turning easily, so as to begin a new stitch immediately along the one already done. The power used to obtain motion was from 16 to 18 horse; the cylinder $5\frac{1}{2}$ inches in diameter, with a ten-inch stroke. There was about 90lb. pressure of steam, and the engine goes nearly 200 revolutions per minute. The cutters in revolving struck against the boiler, which ought not to have been the case, had a proper trial been made of the engine before it was sent to the show. We need scarcely remark that the engine stuck fast in the field, to the regret of many, but not to the astonishment of those who know anything of machinery, and who might have safely predicted the results which it produced. Mr. Crawley's set of ploughs, each containing two plough bodies fixed heel to heel, for working up and down the field without turning at the ends, was tried by Fowler's tackle, but failed to do their work in a proper manner.

THE TRIALS.

The trials took place in a field at Blacon, where the soil was very hard on the surface and stiffish below, and fully strong enough for testing the working powers of the implements and engines. It was a clover ley, and could not have been broken up for some time preceding. Messrs. Fowler, Mr. Boydell, and Messrs. Howard (working Smith), time the several competitors; and as Mr. Rickett was stuck fast in the field below, the interest of the ploughing from day to day was principally concentrated upon the three named. The work done by Smith's implements was as good as it well could be; and every practical farmer who saw it declared that they should desire nothing better for breaking up the soil, and thoroughly pulverising it and cleaning it of its filth; but there were a great number who preferred to have the soil turned over, and could not realise the idea of perfect cultivation without a thorough inversion of soil. The interest, therefore, gradually settled down, with the exception of one or two marvellous feats of Boydell, upon Fowler's operations.

There is one thing, we believe, clearly established by the trials of steam ploughs fixed in a frame—unless the land is pretty even several portions of it are left untouched, for the implements are too rigidly in a line, and have no independent action to touch

the sunken portions of the inequalities of the soil. These, therefore, in many instances go uncultivated; and as we examined a great deal of the work done by Fowler, we can fully verify this fact. The fields, indeed, must be laid out specially at right angles and even in surface before ploughing by steam, according to the plan of Mr. Fowler, can be effectually done. We must say, however, that the furrow slice was cut much better than we saw it upon previous occasions, and the soil was fairly inverted; but when compared to good horse ploughing it is much inferior at present, and unless it can be done more economically than the latter, all things being considered, the invention is not yet in operation that it is at all likely to supersede the plough, assuming that the practice of inverting the soil is to be adhered to. The following may be considered as a fair summary of the details involved in Mr. Smith's plan, and in that also of Mr. Fowler:—

SMITH'S APPARATUS.

An eight-horse ordinary farm engine, sufficient to work all the implements. Windlass and tackle easily shifted from place to place. Anchor sufficiently firm for all useful purposes. This is a kind of safety-valve when the implement chances to strike against a root, or a large stone, as the anchor gives way, and thus prevents the breaking of tackle. The ropes being coiled on a windlass, triangular and crooked fields are as easily cultivated as square ones. The turning bow is arranged so as to turn ploughs, cultivators, harrows, rollers, drills, or other implements. The trenching plough exposes a greater surface to the action of the atmosphere than the common plough, and cultivators can break any strong land, even in the driest weather; a common plough can also be added to the same apparatus. Smith's anchor, and windlass, and plough, exclusive of the engine, is £187, and is therefore within reach of the ordinary farmer. Any repairs necessary can be done by a blacksmith.

FOWLER'S APPARATUS

Requires an engine nearly double the power of that of Smith's. Windlass must be separated from the engine for removal. Anchor stands great resistance, but should the implement strike against a root or heavy stone, a break down may likely take place. The rope being endless, necessitates anchor being parallel with engine; therefore crooked and irregularly shaped fields cannot readily be ploughed. Must work all double or two-way implements; even a drill must be so; the weight is thus greatly increased. Plough may be worked upon light land, but cannot work to advantage on clay land, nor can it break up hard dry land of any kind. The price of Fowler's apparatus varies according to the power of the engine employed. If for a seven-horse engine the price is £240; for an eight-horse engine £290; for a ten-horse £468.

(*To be Continued.*)

THE DINNER AT THE CHESTER MEETING OF THE ROYAL AGRICULTURAL SOCIETY, ENGLAND.

The dinner was numerously attended, and several distinguished foreigners were present, among them Mr. Sandford Howard, of the *Boston Cultivator*. We subjoin the greater portion of the eloquent and suggestive speech of the Right Hon. W. E. Gladstone, M. P., a distinguished statesman, merchant, and scholar, which will be read with nearly as much interest on this side the Atlantic as in the mother country:—

The Right Hon. W. E. GLADSTONE, M. P., was received with loud cheers. He said: My Lords and Gentlemen, I am quire sure that I could not fail of addressing what would be acceptable to you this evening if only it were true that the subject with which a man has to deal inspires with it ideas that appropriately belong to it; for you have chosen me, my lord—and it is only in obedience to your commands that I acquiesce in your choice—you have chosen for me an undeserved honor in entrusting me with the charge of proposing to this company that they should drink what every man will drink with the utmost satisfaction and joy—"Prosperity to the Royal Agricultural Society of England" (applause). For this is a toast, my lord, that carries written upon its very brow, the whole of its claims to an enthusiastic reception (applause). A society founded under the highest auspices, a society which invites in its support every class of the community; and which, therefore, is itself among the efficacious means of exhibiting to the world the union of classes, without which there is no strength in any community—

(applause)—and with which every community is irresistible and indestructible; and this society is so founded, and so combines the universal suffrages of the country, directed, as it is, to such a purpose as that of promoting the most essential and the most venerable among all the arts that furnish material for the industry of man (applause).—Whatever else may come and whatever else may go, this at least we know, that no vicissitude of time or change can displace agriculture from the position it has ever held—(Hear, hear)—from the very first state of the generations of man until the last day in the crack of doom itself (cheers). Now, my lord, as one having indeed little claim to address you, but not uninterested in agriculture and its results, I will state in a few words to this company why it is I think we ought to feel grateful to the Agricultural Society for having chosen Chester as the scene of one of its meetings, and for the general prosecution of its labours, with that energy, intelligence, and success that have ever marked its progress. In the first place I take it that it is of the utmost importance to agriculture that it should have the means of recording its ascension and its decline. We must not suppose that because it is an ancient art, and one that has been prosecuted in its simplest forms, it is therefore otherwise than an art which, of all others, perhaps, affords the most varied scope and the largest sphere of development to the powers of the human mind (Hear, Hear). And it is most essential, if, indeed, it be true, as true it is, that a large part of the national welfare hangs upon its prosperity—it is most essential that you should have the best and most efficacious means of comparing its state in one year with its state in another—of recording for future encouragement the progress that has been achieved in the past; and if perchance a time should come when in any one of its branches of enterprise some partial failure should be perceived, that that failure should be noted at the first moment when it becomes visible, in order that the sense of the defect may lead to its being at once repaired (Hear, Hear). My lord, I think it may be truly observed that this—I must say distinguished—I may say illustrious society, appears to me to supply a want which is the greatest inherent want of agriculture. If we look to the case of manufactures, it is their nature to collect themselves in enormous masses around great centres of industry. If we look to commerce, incessant communication between every part of the commercial system of the country is the very vital it breathes, and is naturally inseparable from commercial development. But with agriculture the case is different; for, on the contrary, its nature is to be gathered around local centres, which, under ordinary circumstances, have little or no connection or communication with one another. It is, in comparison, an isolated art, and therefore it might follow, under general circumstances, that agriculture was languishing in various quarters of the country, simply from the want of a knowledge of the progress achieved in other portions of the land. (Hear, hear.) Well, now, if I am right in saying that this is the besetting danger and difficulty of agriculture, is it not true and obvious that the society, whose festival we commemorate to-day, is, by the very principles of its construction, adapted effectually to supply that want—(Hear, hear)—for its business is to bring together the men and the minds of all portions of the country. The stock of Devonshire, the horses of Suffolk, the various products of England, are exhibited in the yards to-day. The agriculture of England, through the means mainly of this society, is rapidly attaining to the position to have but one heart and one mind—one common pulse that causes the circulation of the vital fluid throughout the whole system—one common stock, into which everything that skill, that industry, that intelligence, that capital had achieved in every single part of the country, made the common property of the other portion of the country (applause.) Well, again, my lord, I will venture to give another reason why myself, an uninstructed person, ventured to feel a sentiment of gratitude to those who, in this matter, give us the benefit of their instruction. If we look to the trade of the farmer, it seems to me to stand distinguished from all other trades—not in the less, but in the greater amount of the demand that it makes upon his mental powers. In point of fact, if we are to regard the farmer as an isolated man, he has got to struggle with everything. He ought to understand the whole universe in which he lives, and almost every science that belongs to the entire range of the human intellect. He ought to be profound in meteorology; he ought to be a consummate chemist; he ought to have such a knowledge of birds and animals as scarcely a life could acquire. He ought to be a machinist of the first order; and in point of fact there is no end to the accomplishments which the individual farmer, to be a good farmer, if he stand alone, ought to possess (applause). And if I take the case of two men setting out in life with a

moderate capital at their command—say two men who have £5,000 to dispose of; and the question being whether they are to enter into some ordinary trade, or whether they are to enter into the business of farming, I say that man who takes his £5,000 to stock a farm, which is let to him as a tenant farmer, will require far more of intelligence in order to enable him properly to transact his business than if he opened a shop in some street in a great city (Hear, hear). Well now, gentlemen, it is eminently desirable, but you will agree with me that it is not possible, that the farmer should be a profound chemist, an accomplished meteorologist, and the possessor of those other arts which it is desirable he should possess. A pretty good knowledge of some of them he may attain through practice, but he cannot be possessed of every accomplishment necessary. What has he to know of the working of machines? Does not the comparative value of machines turn often on matters of profound calculation? What is he to know of the analysis of soils? What of the manures which he employs? Here, again, comes in the Royal Agricultural Society. The Royal Agricultural Society applies to the machines that are offered to your patronage, the severest test that science has devised. It applies to the manures with which you are to fertilize the ground, those searching analysis which enable you to know with what materials you are dealing; and, in point of fact, in general enables you to prosecute the arduous path of improvement under the safeguards and guarantees of a knowledge which no single individual can possess, but which this society amasses and accumulates, brings to the door of every man, and places therefore at his disposal (applause). Well, now, my lord, I think, reasons enough why we should be grateful to the Royal Agricultural Society for having come here to hold its meeting in the ancient and venerable city of Chester. I feel indeed ashamed to be the organ, in any sense, of the sentiments of this neighborhood, when I remember the recency of my own connection with it, and when I recollect that I speak in the presence and in the neighbourhood of those whose families have been rooted to the soil for more centuries almost than I could count years. But, at the same time, I cannot help feeling how appropriately this scene has been chosen for the present anniversary. In this town we meet under the shadow of a venerable cathedral. We meet in a city which derives its name from a denomination established in England 2,000 years ago. But yet we see this ancient city, which has been lately subjected to the influence of change—we see it now becoming the centre of the new traffic—stretching forth the arms of its suburbs right and left, and promising so to flourish and to grow that the Chester of the 18th century will by-and-by be scarcely recognised in the expanded dimensions of the Chester of the 19th. It associates the new and the old—it associates them as they are associated by the Royal Agricultural Society, which, aiming at the improvement of the one great primitive pursuit of man, brings to bear upon the primitive pursuit of every discovery of history—all the patient thought of to-day, all the hope of to-morrow and the future (applause.) And let me add this—for I am sure, if there be one cause more than another that has given to this society its place in your universal confidence, it is that which I am about to mention. I have no doubt you love it for the purposes to which it is directed. I have no doubt you rejoice in the union of classes which it exhibits. But, as it appears to me, there is nothing more admirable in its constitution and machinery than that prevailing spirit of publicity and fair play which attends the whole of the proceedings (applause.) It has functions to discharge which involve the reward of merit. The reward of merit involves constant comparison of merit. The comparison of merit necessarily grates upon the feelings; and yet, notwithstanding, here is a body which deals with every kind of product of agriculture, and every kind of instrument applicable to agriculture, which yet continues to retain universal confidence—the confidence alike of the victors and the vanquished in their honorable strife (cheers). And why is this? It is because its proceedings, like all other agricultural proceedings, pretty nearly, are completely in the face of day. There is no secret about its details. The spirit of secrecy it abhors. Everything that is done is done subject to the free judgment of Englishmen. The judges themselves, who pronounce upon your performances, are judged, in your free, unlicensed, and unrestrained liberty of communication. And the spirit that I believe has, more than anything else, tended to preserve for us the vital power of our public institutions—I mean that of a thorough, and unshrinking, and unswerving publicity—is the spirit which we regard as the guarantee of fairness, and is the spirit to which every proceeding of this society appears to be made to conform. (Hear, hear). I cannot help reminding this company with reference to what has fallen from the distinguished Ambassador of France, that he perhaps has done us more than

justice when he speaks of the benefits that the industry of his own country has received from the industry of ours. It is but fair that those acquainted with the history of the commercial, and particularly of the manufacturing progress of this country, should here publicly acknowledge in return for the compliment he has paid you, that it is to Frenchmen, and to the sedulous imitation of what Frenchmen have done, by their taste and skill, that we owe no small part of the rapid progress of the day to the manufacturing prosperity of England (applause). And to you, gentlemen, who know nothing, thank God, of rival interests as between class and class, to you I am sure it will be matter of deep satisfaction if you hear from authority so distinguished and illustrious the assurance that some part of the benefits at least which British manufactures have received from those of France have been repaid and compensated in what France has learned from the industry and skill of the British farmer (applause).

M. de Trebonnais said, the toast I have to propose is, "The Railways." If our age wanted an appropriate emblem to stamp its peculiar character in the annals of history —if a great fact was wanted—who, among the living generations of mankind, would for a moment hesitate to proclaim with grateful and exulting acclamations, the words "railways," a mighty engine of peace, civilization, and progress. Like living arteries, they propel through the land life, judgment, and activity. They equalize the remunerations of our labor and industry by bringing the best markets to the door of our barns and the gates of our paddocks. With the swiftness of lightning, the resistless might of steam, they scatter abroad light, knowledge, and morality. They bring near distant men and things; they throw the broad light of comparisons into hidden corners, and deep-rooted prejudices which, beneath their benign influence, melt like the wintry snow before the beams of the spring sun; and raising our speculations to a more solemn and more exalted sphere, are they not the mighty instruments of God's providence, in promoting grace and good-will among men by fostering general acquaintances and connections between communities, and bringing within the ready reach of our wants and comforts all the treasures and luxuries which nature, the work of his almighty hand, has so bountifully scattered in endless profusion and variety all over the world? If as members of the great human family, we are bound to revere this toast with an enthusiasm commensurate with its merits, are we not more so, as agriculturists, as Englishmen or foreigners, and especially as members of the Royal Agricultural Society?—Without the existence of railways, could the truly magnificent spectacle we now contemplate under the ancient walls of this city, have been displayed to our delighted admiration? Could the vast concourse of people which have flocked from this densely-populated neighborhood, from your blue Celtic hills, and even from foreign lands, have gathered together within the frail enclosure which contains such valuable riches? And lastly, let us contemplate with a moment's thought, the great influence this spectacle cannot fail to exert over the agricultural population of this district—an influence which, without the existence of railways, would have been confined and narrowed into a limited circle (loud cheers).

THE PROGRESS OF ENGLISH AGRICULTURE.

(*Continued from Page* 108.)

In 1798 the Duke of Bedford, Lord Somerville, and others, with Arthur Young as honorary secretary, established the 'Little Smithfield Club,' for exhibiting fat stock at Christmas time, in competition for prizes, with a specification of the food on which each animal had been kept. This society has rendered essential service by making known the best kinds of food, and by educating graziers and butchers in a knowledge of the best form of animal. We smile now on reading that in 1806, in defiance of Mr. Coke's toast, 'Small in size and great in value,' a 'prize was given to the tallest ox.' Length of leg has long been been counted a serious fault; for it is the most unprofitable part of the beast. In 1856 a little Devon ox, of an egg-like shape, which is the modern beau-ideal, gained the Smithfield gold medal in competition with gigantic shorthorns and Herefords of elephantine proportions; and in 1854 a large animal of

Sir Harry Verney's was passed over without even the compliment of a 'commendation,' because he carried on his carcase too much offal and more threepenny than ninepenny beef.

But the fattening qualities and early maturity of the improved stock would have been of little value beyond the few rich grazing districts of the Midland counties, without an addition to the supply of food. The best arable land of the kingdom had been exhausted by long years of cultivation, and the barren fallow, which annually absorbed one-third of the soil, failed to restore its fertility. A new source of agricultural wealth was discovered in turnips, which, as their important qualities became known, excited in many of their early cultivators much the same sort of enthusiasm as they did in Lord Monboddo, who on returning home from a circuit went to look at a field of them by candle-light. Turnips answered the purpose of a fallow crop which cleaned and rested old arable land; turnips were food for fattening cattle in winter; turnips, grown on light land and afterwards eaten down by sheep which consolidated it by their feet, prepared the way for corn-crops on wastes that had previously been given up to the rabbits. By this means the heaths and wolds of Yorkshire and Lincolnshire, with the help of marling in certain districts, the blowing sands of Norfolk, Nottinghamshire and Bedfordshire, were gradually reclaimed and colonized by the race of farmers who have been foremost to adopt all the great improvements in English Agriculture for the last century. This new system required a capital on the part of both landlord and tenant. It required from the landlord barns and yards and houses fit for first-class farmers. Mr. Coke of Holkham laid out above a hundred thousand pounds in 20 years on dwellings and offices. It required the tenant to expend a considerable sum on flocks and herds, and, above all, in labour for the years before the wild lands began to yield a profit. Mr. Rodwell, in Suffolk, sunk £5000 in merely marling 820 acres, with a lease of only 28 years. Such spirited proceedings demanded no mean amount of intelligence to conduct them with discretion and profit. The value of Mr. Rodwell's produce during the 28 years of his occupancy was £30,000 greater than in the 28 years which preceded his improvements. No needy race of peasant cultivators, no rack-rent absentee line of landowners, could have achieved this conquest over the English wilderness, then far from ports, manufacturing towns, and markets.

This great advance in arable farming took its rise in Norfolk. The king of Brobdignag gave it as his opinion, 'that whoever could make two ears of corn or two blades of grass to grow upon a spot of ground where only one grew before, would deserve better of mankind and do more essential service to his country than the whole race of politicians put together.' This passage might have been written upon Lord Townsend, who retired in 1730 from public affairs, which went on none the worse without him, and devoted the remaining eight years of his life to improving his estate. He originated practices which increased the produce not only two, but a hundred fold, and of which the world continues to reap the benefit at this hour. To marl and clay farms was an old practice in England; for Harrison in his 'Description of Britaine,' in the reign of Queen Elizabeth, says, 'Besides the compost that is carried out of the husbandman's yards, ditches, and dove-houses, or out of great towns, we have with us a kind of white marl, which is of so great force, that, if it be cast over a piece of land but once in three-score years, it shall not need of any further composting.' The usage seems, however, to have died away, and its advantages were rediscovered by Lord Townshend and a Mr. Allen, who applied it to the sands of Norfolk, and converted boundless wilds of rabbit-warrens and sheep-walks into rich, grain bearing soil. Young estimated that before the close of the century 'three or four hundred thousand acres of wastes had been turned into gardens,' and rents

rose from sums between sixpence and two shillings an acre to fifteen shillings and twenty. Many of the tenants realized a capital which amounted to more than the reputed worth of the property. A Mr. Mallett made a fortune in thirty years on a farm of 1500 acres, and bought land of his own of the value of £1700 a year—a more remarkable example even than that of the Scotch proprietor mentioned by Dr. Cartwright, who, being compelled to sell his estate, hired it on a lease, and afterwards repurchased it with the profits he derived from his tenancy.

But marling would not of itself reclaim the Norfolk deserts. Turnips, which are said by Young to have been brought into farm cultivation by the celebrated Jethro Tull, found such a zealous advocate in Lord Townshend, that he got the name of 'Turnip Townshend.' Pope speaks of 'all Townshend's turnips' in one of his Imitations of Horace, published in 1737. This crop he had the sagacity to see was the parent of all the future crops. Without winter food little stock could be kept, without stock there could be little manure, and with little manure there could not be much of anything else. The turnips were, therefore, employed to secure a large dung-heap, and the dung-heap in turn was mainly appropriated to securing the largest possible store of turnips. This tillage in a circle was as productive as it was simple. The ground cleaned and enriched by the root-crop, afterwards yielded abundant harvests of corn; and as we have already stated, the treading of the sheep upon the loose soil, while they fed off a portion of the turnips, gave it the necessary firmness. Thus, through the agency of turnips a full fold and a full bullock-yard made a full granary. Essex and Suffolk soon copied the method, but they did not carry it so far as in Norfolk; and in many places the turnips were never thinned or hoed, upon which their size and consequently nearly all their value depended.

The rotation of crops was, however, considered the especial characteristic of the Norfolk husbandry. Until past the middle of the century no just ideas prevailed upon the subject in any other portion of the kingdom. Sir John Sinclair says all courses were thought to be alike, and deserving neither of praise nor censure. The grand rule of the Norfolk cultivators, to which they steadily adhered, was never to be tempted to take two corn crops in succession. But, in truth, no one part of their system could be dispensed with, and its value was as a whole. They had not only learnt the importance of alternating grain with other products of the soil, but they had ascertained the particular advantage of having the barley follow the turnips, the clover the barley, and the wheat the clover; for the fibrous roots of the latter were the finest possible pabulum for the lucrative wheat, and nothing else would have been equally efficacious. Young found his four course-system widely prevalent in 1767. The principal variation, he says, was in the duration of the clover, which some persons allowed to remain for two or three seasons before breaking it up for wheat. All these changes were brought about in the thirty years from 1730 to 1760, but they were confined, with slight exceptions, to Norfolk itself; and it was not till after Young appeared upon the scene that they began to penetrate into other districts.

After a considerable interval, during part of which Francis, Duke of Bedford was the agricultural leader, another great Norfolk landowner succeeded to the mantle of Lord Townshend. This was Mr. Coke of Holkham, afterwards Earl of Leicester, who, towards the close of the last and throughout the first quarter of the present century, headed the movement. The reclaiming the wastes of Norfolk, the marling the light land, the extensive cultivation of turnips, and the introduction of the rotation of crops, have all been ascribed to him. But as Young, in the Tours he published several years before Mr. Coke possessed an acre in the county, states that every one of these practices was then in common use, and constituted the general features of the Norfolk husbandry, it is evident

that this is another of the numerous cases in which the last improver is credited with the accumulated merits of his predecessor. But though the precise nature of what Mr. Coke effected is often misunderstood, the amount of his services has not been overrated. He stands foremost among the class of whom Arthur Young wrote in 1770—'Let no one accuse me of the vanity of thinking that I shall ever by writing, wean farmers of their prejudices: all improvements in agriculture must have their origin in landlords.' Five years afterwards Mr. Coke succeeded to the estates of the Leicester family. The fine house at Holkham, erected from the designs of Kent, about the middle of the last century, bears an inscription which imports that it was built in the midst of a desert tract, and its noble founder was accustomed to say, at once jocularly and sadly, that his nearest neighbour was the King of Denmark. There was still many a broad acre in its primitive state of sheep-walk, and Mr. Coke graphically described the condition of portions of the property surrounding this princely mansion by the remark 'that he found two rabbits quarrelling for one blade of grass.'' His first care was to apply the existing methods to fertilising his barren wilds; his second was to improve on the prevailing practices; his third was to persuade his countrymen to follow his example. From the thirty years between 1760 and 1790 both landlords and tenants were content to follow in the track which Lord Townshend had marked out for them—a track which led to such wealth that it is no wonder they were not tempted to further experiments. Mr. Coke roused them from their lethargy, and what Young calls a second revolution, commenced. The great evil of the time was the isolation in which farmers lived. They were nearly as much fixtures as their houses, and what was done upon one side of the hedge was hardly known upon the other. The lord of Holkham instituted his annual sheep-shearing, at which he feasted crowds of guests from all parts and of all degrees. Under the guise of a gigantic festival, is was an agricultural school of the most effective kind, for the social benevolence engendered by such magnificent hospitality disarmed prejudice, and many who would have looked with disdain upon new breeds of stock, new-fangled implements, and new modes of tillage, regarded them with favour when they came recommended by their genial host. Hot politician as he was, according to the fashion of those days, his opponents forgot the partisan in the agriculturist; and when Cobbet, who had no leaning to him, rode through Norfolk in 1821. he acknowledged that every one 'made use of the expressions towards him that affectionate children use towards the best of parents.' 'I have not,' he adds, 'met with a single exception.' The distinguished visitors who came from other counties to the sheep-shearings carried home with them lessons which had an effect upon farming throughout the kingdom.—Excluded by his political opinions from Court favour or office, Mr. Coke must have found abundant compensation in the feudal state of gatherings, at which, as a contemporary journalist records, 'hundreds assembled and were entertained —farming, hunting, or shooting in the mornings—after dinner discussing agricultural subjects, whether the Southdown or the new Leicester was the better sheep—whether the Devon or the old Norfolk ox was the more profitable.'* In dealing with those who farmed under him, he showed the same wisdom as in his own tillage. He formed an intimacy with Young, and acted upon three of his maxims, on which agricultural progress may be said to depend—that 'a truly good tenant-farmer cannot be too much favoured, or a bad one have his

*The Holkham sheep-shearing were evidently arranged by an eminently practical mind; and we have had nothing approaching them at the present day, unless it be in Easter week, a year ago, when Lord Berners, one of the pupils of Coke, entertained a party of farmers, with his tenants and friends, at Keythrope Hall, where much-needed improvements have been transplanted from Norfolk.

rents raised too high'—that good culture is another name for much labour'—that 'great farmers are generally rich farmers.' By these methods he raised his rental to more thousands a-year than it was hundreds when he inherited the estate, and had enriched a numerous tenantry into the bargain. Swift, in his satirical 'Directions to Servants,' advises the steward 'to lend my lord his own money.' The bailiff of Lord Peterborough pulled down his master's house, sold the materials, and continued to charge him for repairs. The last case was peculiar; but for the steward to grow rich at the expense of an employer who neglected his own affairs was common enough. Mr. Coke was a conspicuous example of the benefit of the opposite practice, for he showed that no profession in the world was so lucrative as that of a landlord who devoted his life to the improvement of his property. The wealth, nevertheless, which accrued to himself was the smallest part of the gain. He was a national benefactor upon a mighty scale, and was the cause, directly and indirectly, of adding a countless mass of corn and cattle, of beef and mutton, bread and beer to the resources of the country.

No discovery, perhaps, in Agriculture was made by Mr. Coke; but he showed a surprising sagacity in singling out what was good in ideas which were not received by the farming public at large, in combining them into a system, and persevering in them until they prevailed. Young states, in his "Report on the Agriculture of Norfolk," * which was published in 1804, that Mr. Coke had even then grown the invaluable Swedish turnip for several years with the greatest success, and used large quantities of purchased manure in the shape of rape-cake. Above all, he at that date drilled the whole of his crops, turnips included, and he was the prominent champion of this much opposed system, which is now universally adopted for the time and labour it saves, for the facility it affords for applying the manure directly to the seed, for keeping down weeds and stirring the soil by means of the horse-hoe, and for thinning out the crop with regularity and speed.

The Norfolk farmers, while attending to arable culture, had never turned their attention to improving their stock. One of Mr. Coke's most intelligent tenants said "that bones and offal, rather than meat, were the production of the best grass-lands in the county." A small number of Norfolk or Suffolk cows, good milkers but miserable graziers, were kept, and a flock of the black-faced, long-horned, Norfolk sheep—an active, bony, hardy animal, well suited to pick up a living on the wild bare heaths, and which gave a little wool every year, and a little mutton at the end of four or five. It is just fifty years since Mr. Coke said, in one of his annual Holkham speeches, "that a Norfolk flock had hitherto been considered as little more, in point of profit, than a dung-cart." He soon taught his tenants that, valuable as was manure, they had better keep animals which would at the same time make a return in flesh and fat. His own skill in the difficult art of judging of the qualities of stock was great, and he used to assist his neighbors in parcelling out the ewes to the rams according to the shapes of each, that the defects of one parent might, as much as possible, be remedied by the good points in the other. "I have seen him and the late Duke of Bedford," says Young, "put on a shepherd's smock, work all day, and not quit the business till darkness forced them to dinner."

(*To be Continued.*)

* Kent's Survey of the Agriculture of Norfolk was published in 1796; the admirable work of Young appeared in 1804; and in 1844 an able and elaborate report by Mr. R. N. Bacon, the editor of the "Norwich Mercury," gained the prize of the Royal Agricultural Society. These surveys, made at intervals, give an opportunity for comparing one period with another, and throw great light upon agricultural and social progress. They are to be classed among the best kinds of history.

TREATMENT OF ANIMALS UNDER DISEASE.

DISEASES OF CATTLE.

(*Continued from page* 94.)

Blood-striking is a determination of blood to the head. The disease is owing to a redundancy of flesh and fat. Its premonitory symptoms are seldom observed, and the remedies, therefore, copious bleeding and active purgation, are seldom taken in time.

Catarrh prevails mostly in the spring of the year, when the wind is easterly, particularly if the weather is wet as well as cold. Young animals are more disposed to this, as well as to other diseases affecting the air passages, than older beasts. Treatment.—Housing, with a dry bed to lie on, and some warm bran mashes, with a little nitre in them, will generally put an ordinary case to rights; but in a severe case, attended with inflammatory symptoms, moderate bleeding and a dose of Epsom salts is desirable. A stimulating liniment may be rubbed into the throat, or what is still better, a seton may be inserted. The following will be a desirable liniment to apply to the coarse skins of cattle in this and other diseases where an external stimulant is called for:—

Powdered cantharides.....1 ounce.
Olive oil.....6 ounces.
Oil of turpentine.....2 "

Mix.

Hoose is a term given to a disease of the windpipe, to which young cattle, and particularly calves, are subject. The symptoms are a dry husky cough, increased respiration, and followed by great weakness and indisposition to move. These symptoms are caused by the presence of small white worms in the windpipe and bronchial tubes, which keep up constant irritation. The simplest treatment is to administer half a pint of lime water every morning, and a table-spoonful of salt to each calf every evening, continuing these doses for four or five days. The disease has also been treated successfully by giving an ounce of oil of turpentine in four ounces of linseed oil, and repeating the dose once a-week several times. The worms are produced by eggs, supposed to be taken with the water, and it has been caused by keeping the calves on a very bare pasture during the summer months.

In Inflammation of the Lungs we have a quick and laborious breathing, in a more striking degree than in the horse, but the pulse is not usually much quicker, and is sometimes full and strong, but more frequently weak. To these symptoms it may be added, that rumination ceases, the mouth feels hot, and the membrane of the nostrils appears red. The treatment of this disease consists of extensive blood-lettings, aperients and febrifuges, and counter irritation. The bleeding should be contined till the pulse falters; from four to six quarts or more may thus be abstracted, and repeated in six hours if the symptoms are not relieved, and the pulse is not too weak. In the horse, we know, it is very dangerous to administer aperient medicine in this disease; but, from the different constitution of the ox, it may be done with advantage.

Hoove, Hoven, or *Blasting,* consists of distention of the rumen, with gas given off by the food, in consequence of its fermentation. The gases thus formed are principally carburetted hydrogen in the early stage, and afterwards sulphuretted hydrogen; and the stomach is very soon distended to an enormous size, and suffocation will follow if relief is not soon afforded. The treatment which suggests itself is to liberate the confined gases, or to condense them by chemical re-agents. The hollow flexible probang, if at hand, should be passed down into the stomach, so that the gas may escape through it, previous or subsequent to which the following draught may be given:—

Powdered ginger.....3 drachms.
Hartshorn.....1 ounce.
Water.....1 pint.

If these medicines are not at hand, some lime water may be given; or, better still, two drachms of chloride of lime dissolved in a quart of water. It is well to follow these medicines by a purgative, in order to restore the digestive organs. Sometimes it is necessary, in order to save life, to relieve the distension by making an incision in the flank, on the left side, between the last rib and the hip bone. If the proper instru-

ments are not at hand, a pen-knife and a quill or stick of elder inserted in the wound will suffice. The wound should afterwards be closed with a stitch and a little plaster.

Distention of the Rumen with food, though not usually attended with such acute symptoms in the early stage, is still more formidable, being more difficult to relieve. Treatment.—In mild cases a drench, composed of purgative and carminative medicine, assisted by injections, has proved successful; and in other cases blood-letting has been required. In obstinate cases, it is desirable to inject a considerable quantity of liquid into the stomach, by means of Reed's stomach-pump, so as to produce an evacuation of the contents by exciting vomiting.

Choking.—A piece of turnip or a potato being hastily swallowed, becomes impacted in the œsophagus, and thus, pressing on the windpipe at its softest part, interrupts respiration, and, if not removed, often ends in suffocation. A little oil or lard should be administered by the horn, and with which the probang should be lubricated. Use rather a large probang, with a knob at the end, but obliquely, and this, passed along the roof of the mouth, enters the œsophagus. When it has reached the obstructing body, use firm and moderate pressure, no more; alternately raise and depress the head. If it does not easily pass, wait; be not impatient, as the longer it remains the softer it gets. When you again try, you will be surprised to see how quickly it is removed: impatience has been the means of killing scores.

Under the term *Fardelbound* is known a disease which appears to consist in a retention of food in the second stomach, between the numerous plaits of which it is firmly impacted. This disease may be produced by means of narcotic plants taken with the food, or by giving too much food of a dry character, and with insufficient moisture, as well as by other causes which disturb and derange the digestive organs. The treatment consists in the administration of aperients combined with stomachics. Epsom salt, with ginger, afford convenient forms.

Scourging, Diarrhœa.—When produced by unwholesome or improper food, a change of diet will sometimes effect a cure; but, if the purging does not cease, the following astringent and tonic may be given :—

Prepared chalk	2 ounces.
Gentian, powdered	2 drachms.
Opium, powdered	½ drachm.

To be carefully mixed with thick gruel, and given once or twice a day, as may be required. If the animal is very young, a lesser dose will be sufficient. If the liver is affected, we should rely chiefly on calomel, in combination with opium—half a drachm of each being given twice a day. In obstinate cases, it is sometimes prudent to clear out the intestines by means of a dose of salts, and afterwards proceed with the calomel and opium. In sucking calves the symptoms of scouring are often owing to derangement of the stomach, which causes the milk to coagulate there, sometimes forming a large mass, the whey of the milk passing onwards and producing purgation, and the fæces when discharged being of a white colour. These cases are attended with much danger. The treatment consists in the administration of medicine having alkaline properties, so as to dissolve the coagulation and neutralize the acids that probably exist in excess in the stomach. Carbonate of magnesia and carbonate of soda will be desirable medicines, in doses of one or two drachms each, according to the age and size of the calf.

Redwater used to be considered as a disease of the kidneys; the dark colour of the urine being supposed to denote the presence of blood. It may be distinguised from disease of the urinary organs, by the absence of any flakes of blood in the urine; and the absence also of that great tenderness of the loins which attends inflammation of the kidneys. It is a disease of the digestive organs, and principally of the liver; the urine being loaded with biliary deposits, which should have passed away by other channels. The symptoms of redwater are, in the first instance, diarrhœa, but soon succeeded by constipation; the appetite is impaired; the pulse and breathing accelerated, and the former weak, with coldness of the extremities and paleness of the membranes. Rumination ceases, and the milk is diminished. The urine is brown, and sometimes becomes black. The disease is most prevalent in or after hot and dry weather, and is produced sometimes by a change from a poor to a rich pasture, and from marshy and cold to dry, sweet, and stimulating pasturage, particularly if in an elevated situation. It is frequent in cows several weeks after parturition. The treatment consists for the

most part in opening the bowels, for which purpose the following draught may be given:—

Sulphate of magnesia	12 ounces.
Sulphur	4 "
Carbonate of ammonia	4 drachms.
Powdered ginger	3 "
Calomel	1 scruple.

To be made into a draught with warm gruel. One-fourth of the above may be repeated every six hours, without the calomel, until the bowels are relaxed; after which mild stimulants, with diuretics, may be given, such as the following:—

Spirit of nitrous ether	1 ounce.
Sulphate of potash	2 drachms.
Ginger	1 drachm.
Gentian	1 "

To be given in gruel twice a-day.

Retention, or *Stoppage of the Urine*, sometimes occurs, and particularly in pregnant cows, from the pressure of the womb on the stomachs. The urine should be removed by means of a hollow tube, called a catheter, and the other symptoms that may attend should be treated accordingly.

Diseases of the Udder.—This part is subject to attacks of inflammation, particularly after calving. The part swells, feels hot, the secretion of milk is interrupted, and the part becomes hard. Treatment.—Hot fomentations should, in the first instance, be practised; and if the inflammation is considerable, bleeding from the milk-veins of the affected side should be adopted. A purgative will be also useful; but if the case commences with shivering, then a stimulant, such as an ounce of ginger dissolved in warm gruel or ale, with two ounces of spirits of nitrous ether, will be most useful, and will sometimes at once stop the progress of the disease. After the fomentation, the following ointment may be rubbed into the part:—

Camphor, powdered	1 ounce.
Mercurial ointment	2 drachms.
Lard	8 ounces.

To be well incorporated.

Quarter-Ill happens to young animals, such as yearling heifers, and is caused by lying on a cold, damp soil, and particularly when there is a hoar-frost. It usually exhibits itself at the early part of winter, and is so rapid in its progress, that an animal quite well the previous evening, is sometimes found dead in the morning. We are rather disposed to think that the part becomes frost-bitten in these very rapid cases. At other times the animal is found with one quarter very much swollen, attended with considerable lameness, and the swelling continues to increase, and soon proves fatal. The course indicated is to bleed in the first instance, unless the pulse is feeble; but, previous to this, a diffusible stimulant should be administered, such as two ounces of spirits of nitrous ether, with a drachm of camphor, and given with warm gruel or water. The part should be well fomented with hot water. The other variety of disease which has received the same designation, happens at a different period of the year, and may be ascribed to a sudden change from poor winter food to rich and luxuriant pasture, which greatly increases the supply of blood. It often attacks two-year-old cattle, and is most prevalent in the spring of the year. Bleeding, to a large extent, should be practised as soon as possible; after which the bowels should be opened, and the part well fomented. Prevention, in these cases, is better than a cure, and it is certainly far easier, and more particularly in the first-mentioned disease. By housing the young animals at night, or at any rate putting them in sheltered yards before the winter comes on, we shall do much towards the prevention of this disease; and, in addition, liberal dietetic treatment will be of great assistance. The use of oil-cake has been found to conduce materially in warding off this disease. So likewise with regard to that which proceeds from an excess of blood, by gradually changing the pasture, so as not to run from one extreme to another, the disease may often be prevented.

The *Epidemic* is ushered in by a cold fit, with a staring coat and cold extremities, which is soon followed by a reaction, in which the extremities become warm, a discharge of saliva is observed from the mouth, and on examination the tongue is often found swollen; the beast appears tender in the feet, and feverish symptoms are

manifested; the pulse being quickened, and the muzzle feeling dry and hot. In the course of the first day, vesicles or bladders are found on the tip and upper part of the tongue, as well as other parts of the mouth, the lips, and between the hoofs and the heels, and in milch cows the teats are often similarly affected. The general treatment of the disease consists in moderating the fever, relaxing the bowels, applying astringents to the mouth and feet, and afterwards, if necessary, supporting the strength by tonics. A dose of salts, with a little sulphur, will be a convenient aperient, and the tonic, when necessary, may consist of gentian, ginger, and sulphate of iron, two drachms of each. A solution of alum, with a little treacle, will be a useful application to the mouth, and the feet may be dressed with a simple astringent powder, or a stronger caustic, according to the state of the parts. If the udder is affected, local bleeding and fomentations will be called for; and if the liver or lungs are involved, the treatment should be modified accordingly.

Pleuro-Pneumonia.—A very slight but short cough, and a little staring of the coat, are the earlier tokens of a departure from health, and may run on for weeks in this state. Then, with an increase of these symptoms, we may notice that the affected beast lags behind the herd, and does not feed so readily as before. This may be considered as the first stage. After some time we find the breathing greatly accelerated, the animal loses flesh, and often with great rapidity, and the appetite is further diminished, and now the attendants are alarmed, and begin to think something serious is the matter. We may call this the second stage, to distinguish it from the third or latter stage, in which the most urgent distress is manifested; the animal is greatly reduced, the appetite failing almost entirely, and ruminination also ceasing; respiration is greatly accelerated, short and catching, the beast, indeed, pants for breath, and soon dies from suffocation. Treatment.—If the herd is large, and only one or two animals appear to be affected, slaughter them at once. It is in the first stage, whilst merely the short husky cough and the starting coat are apparent, that treatment may be instituted with a fair probability of success. A moderate blood-letting may be given, but it must neither be large nor repeated. Blister, by rubbing into the sides, previously stripped of hair, the ointment of iodine of mercury, and of tartarized antimony, and the ointment of cantharides, mechanically combined; and if we wish to render it still more stimulating, we may add a little croton oil. We may also insert a large seton in the dewlap, with the view of taking up and continuing the counter-inflammatory action after that of the blister has ceased. With regard to internal remedies, we may first regulate the bowels by means of Epsom salts and linseed oil, and then administer the following sedative, respecting which experience enables us to speak most favorably:—

White hellebore, powdered.....1 drachm.
Tartarized antimony.....1 "
Nitrate of potash.....2 drachms.

This powder may be mixed up with gruel, and given morning and evening the first day, and once a-day afterwards, continuing the medicine for about four or five days. Bran and linseed mashes may be given; indeed linseed, either in the form of crushed seed or cake, is a very desirable food for an animal either suffering under, or recovering from, this complaint.

The Drop after calving, as it is usually termed, is one of the most annoying diseases to which our dairies are liable. One of the symptoms is a torpid state of the stomachs and bowels, rumination ceases, and the food in the various stomachs remain in an unchanged state. Our first object must be, then, to restore this loss of action by means of purgatives and stimulants, and it is surprising what a vast quantity of medicine the cow, in the acute and severe variety of this disease, can take with impunity:—

Take sulphate of magnesia..... 1 pound.
" flowers of sulphur..... 4 ounces.
" croton oil.....10 drops.
" carbonate of ammonia..... 4 drachms.
" powdered ginger..... 4 "
" spirit of nitrous ether..... 1 ounce.

The above should be carefully mixed and dissolved in warm oatmeal gruel, and given to the cow slowly and carefully. In particularly severe cases, and where there is obstinate constipation, the croton oil may be increased, and from four to eight grains of powdered cantharides may also be added. A strong stimulating or blistering liniment

should be rubbed on the spine, particularly on the loins, and a fresh sheep-skin may be afterward placed on the loins, the woolly part outside. Every six hours, one-fourth of the above medicine, with the exception of the croton oil, should be given, until purging is produced, which may be facilitated by raking and clystering. If the cow cannot or does not pass her urine, it should be removed from her by means of the catheter. Plenty of nourishing gruel should be given, and bran mashes and other foods offered. In the milder form of the disease, the medicines we have advised should be administered, or rather repeated, with somewhat greater moderation. In order to prevent the disease, in-calf cows should have plenty of moderate exercise, shelter from the weather, and moderate feeding. The natural grass of the field, during the summer and autumn, and oat-straw, with a little hay, and a few roots in the winter, will be sufficient; but this must be regulated by the condition of the cow—she should not be allowed to make too much flesh. At the same time, protection from the weather should be afforded, and care taken that the cow is not worried by dogs, or allowed to leap her fences.

Abortion.—When abortion takes place at a very early period of pregnancy, there is usually but little disturbance of health, and treatment is rarely required. At a late period, however, the disturbance is great, and serious consequences sometimes follow, such as inflammation of the womb, and even death. It is advisable, when treatment is required, to give a dose of salts to relax the bowels, and it may be followed by a sedative, such as an ounce each of laudanum and spirit of nitrous ether. When there is inflammation of the womb, hot fomentations should be applied externally to the loins for a long time together, and warm water should be gently syringed into the blood. Some blood may also be abstracted. When abortion is threatened, it sometimes happens that it may be prevented by prompt treatment. The animal should be bled, kept quiet, and one and a half ounce of tincture of opium, and a similar quantity of spirit of nitrous ether should be given, but purgatives avoided. When a cow has aborted before at a particular period, it is prudent to abstract some blood just previous to this time. It generally happens that the after-birth is retained after abortion, and it is better to remove it, if possible, although it be necessary, in order to accomplish this, to introduce the hand into the uterus, and detach the placenta from it, by breaking down carefully the points of attachment.

Diseases of the Skin.—Mange is produced either by poverty or contagion. The treatment consists in rubbing in, with plenty of friction, an ointment containing sulphur, such as the following:—

Sulphur vivum	4 ounces.
Linseed oil or train oil	8 "
Oil of turpentine or oil of tar	2 "

Mix.

Lice occasionally infest cattle that have been reduced by poverty of living, and prove a source of much irritation, though not to the same extent as the mange. Either the ointment recommended for mange, or a decoction of tobacco, will have the effect of destroying the insect.

(*To be Continued.*)

Potato Rot.—The Perth *Constitutional* says:—"We understand that the potato rot is making its appearance very extensively in this section of the country—scarcely a field escaping its ravages, and many being almost utterly destroyed. Quite a number of farmers are digging up their potatoes and selling them. It is supposed that one-half or two-thirds of the entire crop will be destroyed.

NOTICE.

THE FIRST EXHIBITION OF THE NORTH RIDING OF LEEDS AND GRENVILLE COUNTY AGRICULTURAL SOCIETY will be holden at FRANKVILLE, Township of Kitley, on the First Wednesday of October next.

GIDEON LEEHY,
President.

Frankville,
Aug. 12th, 1858.

WM. SMITH,
Secretary & Treasurer.

THE

Canadian Agriculturist,

AND

JOURNAL OF THE BOARD OF AGRICULTURE

OF UPPER CANADA.

VOL. IX. TORONTO, AUGUST, 1858. No. 8.

ANNUAL EXHIBITION OF THE AGRICULTURAL ASSOCIATION OF UPPER CANADA.

The arrangements for this great annual gathering are now (Sept. 13th), nearly completed, and everything seems to indicate that the approaching Exhibition will be very superior to any of its predecessors, in attractiveness and magnitude. The *Crystal Palace*, a capacious and convenient building, is completed, and the fittings up for the arrangement of the articles to be exhibited therein, are fast progressing. This building in itself will be a great attraction, and is so arranged that the most costly articles will be perfectly secure against bad weather, and other accidents; and will be advantageously seen by visitors without the great inconvenience of crowding, hitherto so much and so justly complained of.

It is of importance that all articles not of a perishable nature, should be sent in by Saturday, September 25th,—not later certainly than *Monday* the 27th,—as the arrangements have to be completed by *Tuesday noon*, in the afternoon of which the judges will commence their inspection, in the different classes.—None but members will be admitted to the show grounds till Wednesday noon, when the opening celebration will take place in the Crystal Palace. His Excellency the Governor General has consented to take part in the proceedings and Lord Napier, the British Ambassador at Washington, and several distinguished gentlemen, both from British America and the United States, are expected to be present. The Metropolitan Choral Society, consisting of upwards of two hundred performers, will assist at the inauguration, and sing several standard pieces of the old masters. Another musical performance will take place on the evening of the same day (Wednesday) at 8 o'clock, by Mr. Carter's Sacred Harmonic Choir. On *Friday*, at 10 o'clock a.m., the annual meeting of the Association will be held, to which each County Society has the

right of sending two delegates. The President's address will be delivered at 2 o'clock, on the same day, after which the Premiums will be declared.

Here will end the Exhibition as far as live stock are concerned; but it has been determined by the Directors to re-open it on the following Monday, and keep it open through the entire week, which will afford the public an excellent opportunity of inspecting articles at their leisure. It is expected that the musical societies before mentioned, will each give a performance during two of the evenings of the second week. Exhibitors of such articles as are not perishable are urgently requested to leave their contributions for the second week.

In order to afford people of all classes and employments an opportunity to see the Exhibition, the Directors have determined on lighting the Crystal Palace with gas, by means of upwards of six hundred burners, commencing on the Wednesday evening of the first week.

The Railways and Steamboats, have entered into arrangements for carrying visitors, stock and articles to and from the Exhibition, at half rates.

EXAMINATION PAPER IN AGRICULTURE, UNIVERSITY COLLEGE, TORONTO, SESSION 1857–8.

Thinking it probable that a large number of our readers have no very definite notion of the nature and extent of the examination of students in Agriculture in our Provincial Collegiate Institution, it may not be devoid of use and interest to publish entire an examination paper belonging to this department. The one subjoined was written by Mr. J. E. Farewell, of Oshawa, in the County of Ontario, and obtained the first prize. The second prize was won by Mr. John Brown, of the County of Wentworth. Two other students had papers of nearly equal merit, and answered several of the questions quite as correctly, though not so fully, as their more successful competitors. These young men had been more or less engaged in practical farming, and availed themselves of several other courses of lectures in the College, besides Agriculture, during the winter season. Young men can enter the College as occasional students, without being subjected to any preliminary examination, and may attend such courses of lectures only as meet their more immediate wants. Agricultural students usually take in addition to the history, science, and practice of Agriculture, Chemistry, Geology and Mineralogy, Natural History, including Botany and Meterology, History, and English Language and Literature. Youths intended for the business of farming can annually go through such, or, if need be, a more extended course of study, and not be absent from their farms during the busiest and most important seasons of the year. All this can be done for a comparatively small expense; but little exceeding that for board and lodging. It is proper to state that the terminal examinations in the College are conducted on the principle of written answers

to a series of questions, to each of which is assigned a numerical value; the students being strictly prohibited from any intercourse with books, notes, or each other, during the period of examination. The agricultural examination occupied two sittings, of two hours each. We give of course the paper as it was written, with only an occasional verbal correction.

Question 1 —Define Agriculture as a *science* and an *art*.

How can a knowledge of its *Theory* and *Practice* be best acquired?

Answer.—1. Agriculture as a *science*, treats of the principles or laws which govern the operations of converting the inert matter of earth, air and water into vegetable productions for the support of animal life.

2. As an *art* Agriculture treats of the *application* of these principles to practical purposes. The former gives the rules of the operations, and the reasons for them. The latter applies the rules advanced by science.

The best mode of acquiring a thorough knowledge of the science and practice of Agriculture, authors of high repute seem somewhat to differ.

Stephens—a good authority in practice—says, this can be best done by living with a farmer, who is a good practical man, and who has in his house an instructor in the theory or science, daily pointing out on the farm the practical application.

On the other hand, Professor Norton is in favour of the plan adopted in University College—attending lectures on the theory and practice as given by a Professor, and afterwards reducing their principles to practice on the farm during the active season of sowing, growth and maturity. To such as have had some experience on a farm, this seems the most suitable plan; or instead or this, attending some Agricultural School with a suitable farm attached, and learning both theory and practice at the same time.

Question 2.—Mention those branches of physical science which have relations to Agriculture;—with illustrations.

Answer.—The various departments of Physics, or Natural Philosophy relating to Agriculture are—

1. Motion, the moving powers, their nature, laws and operation, the effects of machinery. Mechanics.

2. The weight, pressure and equilibrium of fluids. Hydrostatics.

3. The motion of fluids in pipes or otherwise, and their capability and value as moving powers. Hydraulics.

4. The action of light on vegetation. Optics.

5. The nature, laws and effects of heat.

6. The laws of electricity, and other meterological phenomena.

7. The nature of air as regards its properties of weight, temperature, motion, &c., and the signs which foretell these movements. Pneumatics.

8. Chemistry, explaining the nature and composition of all bodies, and the laws of their combination.

9. Botany, treating of the structure, uses and classification of plants. Also including vegetable physiology, explaining their functions, diseases, &c.

10. Zoology, relating to the structure and classification of the animal kingdom, with which is connected comparative anatomy and physiology of the domesticated animals of the farm.

11. Geology, explaining the structure and arrangements of rocks, their origin and diffusion, with the decomposition whereby soils are formed.

Question 3.—Give a general sketch of the History of Agriculture from the Egyptians, Greeks and Romans to the middle ages. In what way did the Church foster and promote this art during the latter period? What are the principal characteristics of modern Agriculture?

Answer.—Of the various branches of Agriculture, that which relates to the raising of fruit, called gardening, seems to have been first practised.

After the flood "Egypt's alluvial lands" seem to have been the seat of the beginning of agriculture, which was subsequently diffused by the colonizing Greeks who regarded it with honour.

Rome subsequently becoming mistress of the world, carried a knowledge and love of this indispensible art to every portion of the earth which witnessed the triumphs of her victorious armies—Britain among the rest.

Different opinions prevail respecting the agriculture of Egypt, both as to its origin and some of its practical applications. The annual irrigation of the Nile richly manured the land, and great crops of grain—particularly pulse—were unquestionably raised. The pick was the first instrument used in cultivation, as would appear from the engravings on ancient medals and seals. The sacred Ox was the only animal used in agricultural labor. In Greece agriculture was carried on extensively, and some of what we often imagine to be purely modern practices were well understood and followed, such as draining, &c. Xenophon, and other writers, were acquainted with the art and wrote upon it, Mogo, the celebrated Carthagenian, wrote several books upon this important subject.

Rome afterwards encouraged it by every means, and many of her most eminent warriors, statesmen and citizens produced treatises on agriculture and practised it as a pursuit. Among them, Columella, Varro, Cincinnatus, Virgil, &c., from whose writings may be gathered many practical principles, that have never been improved.

Agriculture was introduced into the British Islands by the Romans, but did not appear to have made much progress till the Norman conquest, 1066, when many Norman Barons came over and encouraged and cultivated it extensively. They are described by a contemporary historian as being "exceedingly addicted to cultivating the land, and raising horses and cattle." When the dark ages came on, agriculture was preserved on the estates of the Church alone, the Monks being the conservators of this art, as they were of

manuscripts and literature; and when learning revived the practice of husbandry diffused itself, and the noble art sprang as it were into new life.

Modern agriculture has for some of its leading characteristics a more general and effectual draining of wet lands, deeper and more thorough cultivation by means of improved implements, as sub and trench ploughing; a more scientific rotation of crops; the economising and more effective application of manures, and the proper adjustment of animals to the amount of land cultivated.

Question 4.—How is matter divided? Define and illustrate *elementary, compound, organic* and *inorganic* substances? What are soil, plants and animals composed of?

Answer.—Matter exists in the following states, viz:—solid, liquid, gaseous and vesicular. A familiar example is water, which by being exposed to a low temperature, becames a solid, (ice) which again is liquified by heat, and by still further heat is converted into an invisible vapour (steam.)

An elementary substance is matter that cannot be reduced to a simpler form; *e. g.*, iron, oxygen, sulphur, &c. A compound body is that which is made up of two or more elementary substances; *e. g.* oxide of iron or rust, consisting of oxygen and iron, sulphate of potassa, composed of sulphur and potassium, &c.

Organic substances are the result of life, in the vegetable or animal, and by heat become decomposed and converted into invisible gases; *e. g.*, carbonic acid, oxygen, hydrogen, &c.

Whereas inorganic bodies do not consume by heat, were never the seat of any sort of life, being purely mineral; *e. g.*, iron, silica or sand, iodine, manganese, &c.

Soils are generally composed of a number of different substances, the principle being clay, sand, and lime, potash, soda, magnesia, manganese, &c., are more or less found in connection with organic substances in all fertile land.

Plants consist mainly of carbon, oxygen, and hydrogen, with small portions of nitrogen, combined with the several substances mentioned in soils.

Animals consist of the same organic elements constituting plants, but with a much larger proportion of nitrogen, and a very great amount of the phosphate of lime in the bones, so valuable as a manure.

Question 5.—State the composition and uses of *atmospheric air and water*, and their relations to vegetable and animal life.

Answer.—Atmospheric air mainly consists of two gases, nitrogen and oxygen; about 79 parts of the former and 21 of the latter in every 100 of common air. There are also diffused through the atmosphere small quantities of carbonic acid gas, ammonia, and some aqueous vapour.

Water consists of a chemical combination of oxygen and hydrogen, in the proportion of 8 of the former with 1 of the latter. This is pure rain water, but the waters of springs, rivers, &c., have in them a number of other ingredients, as lime, soda, &c., in varying proportions.

Neither plants nor animals can live without air and water. The former derives much of their food from the atmosphere by means of their leaves; while water is necessary to dissolve the manuring substances in the soil that they may enter the plant in a fluid state by its roots. Air is essential to the breathing of animals; the nitrogen properly diluting the otherwise too powerful action of oxygen, while the carbonic acid exhaled in breathing forms the principal organic food of plants.

Question 6.—Give a brief description of the general *structure and functions of plants and animals,* and their relation to the soil.

Answer.—Plants consist of various kinds of matter held together by the chemical and vital forces, and arranged into what are termed cellular and vascular tissue. The principal parts are the root, stem and leaves. The root fixes the plant in the soil, and supplies it with inorganic food from the surrounding medium. The leaves expand, and catch and absorb, by means of their numerous and minute pores, organic food, consisting of gaseous matter floating in the atmosphere. Every part of a plant is endowed with tubes, vessels, and cells, for the circulation and elaboration of the sap, which by a power and process, as yet but imperfectly understood, converts these fluids into the different parts of its own solid structure.

Animals are very differently constituted, having the power of locomotion, they can go in search of their food, if need be, and they digest it in their stomachs. Their structure and functions are exceedingly interesting; the blood, like sap to the plant, derived from food, freely circulates through the system and repairs its waste and increases its bulk. Vegetables constitute the connecting medium between the mineral and animal kingdoms. Animals cannot obtain nouishment directly from the earth. The plant lives upon the mineral, converts dead matter into living organisms, and the animal subsists directly on the vegetable, a simple yet truly wonderful arrangement.

Question 7.—What are the essential conditions in the *germination, growth* and *maturity* of plants? What is plant-food, and how is it assimilated? When is the proper time of cutting grass for hay, and also grain? With reasons.

Answer.—Warmth, moisture and air are each essential to the germination and growth of plants. Seeds, when thoroughly secured against these agents, by being buried deeply in the earth or otherwise, will remain for ages, but as soon as exposed to them will show signs of vitality and germinate. Wild mustard in our fields is an illustration in point.

Plant-food consists of the matter of which the structure of vegetables is composed; they get gaseous matters, such as carbonic acid, oxygen, and ammonia, by means of their leaves, from the air; and inorganic materials, such as lime, potash, soda, &c., through their roots from the soil, in a state of solution by water.

The grasses should be mown for hay as soon as in full blossom, when they contain the largest amount of saccharine and other nutritious substances. And

the proper time for cradling grain is when it has got out of the milky state, and begins to harden, and the stems turned yellow. If either grass or grain is allowed to become dead ripe before cutting, the sugar of the former, and the starch of the latter are converted into woody fibre—the bran is increased—and the flour diminished. In practice this truth is too commonly overlooked.

(To be Continued.)

As was advised in our last number, the present issue comprises only the monthly sheet of the Journal. This is done in order to overtake the proper time of publication. The next, the September No., will be got out as quickly as possible, and will appear as heretofore, a sheet of the Journal and one of the Transactions, under cover.

THE CROPS OF 1858.

To the Editor of the Agriculturist.

BUREAU OF AGRICULTURE AND STATISTICS,
September 3rd, 1858.

SIR,—A number of circulars having been issued by this Department for the purpose of gleaning information about the probable yield of crops of 1858, and the diseases affecting them, it is desirable at this season of the year to let the farmers know the result of some of these inquiries, in order to guide them in the sowing of Fall wheat, and enable them to judge of the propriety of leaving part of the land for Spring wheat. Thirty-five returns from twenty-six counties have been received and analyzed. In eighteen of these counties the wheat midge and rust have been very prevalent, and the crop seriously injured—namely, in Waterloo, Oxford, Grey, Norfolk, Durham, South Simcoe, York, Kent, Welland, Victoria, Perth, Essex, Wentworth, Elgin and Ontario, in Canada West, and Vercheres, Brome and Dorchester in Canada East. In three the rust and mildew, without the midge, were very destructive—namely, Waterloo, Peel, and Pontiac. The wheat crops in Stormont, Carleton, Grenville, Lanark, and Russell, in Canada West, and Huntingdon in Canada East, are said to be free from disease of any kind, except a slight rust in Russell.

The average produce of the whole twenty-six counties is 12½ bushels per acre of winter wheat, and 14¾ bushels of spring wheat—showing a deficiency of about 40 per cent. in winter wheat, and 10 per cent. in spring wheat. A fact worth noting is, that the spring wheat called Fife or Glasgow wheat, has entirely escaped injury from rust; and also that all spring wheat sown after the 20th of May, has escaped injury from the midge (or wheat fly,) being too late for the fly, which deposits its ova from the 20th June to the middle of July. Wheat thus late sown is not forward enough to receive the deposit. A species of wheat, called the Mediterranean wheat, is also said to be free from the ravages of the midge, but does not appear to be highly approved in other respects. The spring wheat called club-wheat is universally condemned, as being subject to rust.

Never before in the history of Canada, has so much injury been done by rust as this year. Many of these reports show that it arises generally, if not always, from want of proper drainage, and of early sowing of early kinds of wheat on well-shaped ridges, well water-furrowed, which are a great aid in the way of drainage. It may be, that the influence of hot, damp, close, muggy weather after a drought, are *less sudden* on well-drained, deeply ploughed, well-cultivated land; and these sudden influences are what cause rust, by the greatly increased sap-bursting the straw and flowing downwards, in-

stead of rising to nourish the ear. This is more probably the cause of rust than fungi, or insects, to which many attribute this most destructive disease; the straw of rusted wheat will, on examination, be found to be cracked longitudinally. With regard to the midge, all reports seem to concur that early sowing of early seed on early land, made early by good drainage and well shaped ridges, is the best preventive; but, under present circumstances, I think the cautious farmer would do well to sow one-half of his land in winter wheat, and the other half in spring wheat, using the above precaution of good draining, &c.

A Mr. Alexander McKenzie, a practical farmer, has written a valuable little pamphlet, showing from repeated experiments that a dressing of lime spread on the land soon after the grub of the midge has fallen from the wheat ear, and whilst in a soft state, is a complete remedy, destroying the grub entirely. This little pamphlet is well deserving the attention of farmers, as lime can be easily procured throughout almost all of Upper Canada, and can be burned without any very great expense, and in addition to killing the grub, will add much to the fertility of the soil. A Mr. Swan, the owner of the farm to which was awarded the 1st prize in Cayuga county, New York, as being the best arranged farm, states that he lessened the destructiveness of the midge very materially by sowing a barrel of salt to the acre after the wheat had brairded.

With regard to other green crops, the reports show an average yield about the same as in other yields; rye, 19⅓ bushels per acre; barley, 19; oats, 31½; Indian corn, 36½; peas, 21½; potatoes, 124½. Of these last there are fifteen returns which state that they were free from rot up to the 30th August last, and eight, which state that the rot had commenced; the other twelve give no report as to rot, which, no doubt, they would have done had it been prevalent. There is certainly a great decrease in the extent and destructiveness of this disease, and it is hoped the root will hereafter be more generally cultivated. The prevalence of the rot has hitherto deterred many from planting.

I may add that there are other counties which have not yet reported, but which are said to be very seriously affected by midge, rust, and blight, viz:—Hastings, Prince Edward, Middlesex, Lennox, Addington, &c. The new lands, however, north of Hastings, on the Free Grant Road, are entirely free from midge, and nearly so from rust.

Yours, truly,

WILLIAM HUTTON, *Secretary.*

THE WHEAT CROPS OF THE UNITED STATES.

The wheat crop in the several States may be considered as harvested and partially ready for market. We can, therefore, give the following returns with some degree of certainty:

New York.—The crop is under the last year's about fifteen per cent., but the quality is much better.

Pennsylvania.—The crop is fully an average one, but ten per cent. less than last year per acre.

Maryland.—The crop is fully an average, but less per acre and better in quality than last year.

Virginia.—The wheat crop in this state is twenty per cent. less than last year for the amount of ground in cultivation, and the quality not much superior.

North Carolina.—The crop in this state is probably nearer to a total failure than in any other. The yield being fully fifty per cent less than last year, and poor in quality.

Kentucky.—The crop is above the average, but less than last year; the quality is, however, unsurpassed.

Tennessee.—The crop is a good one, but under the average in yield per acre. The quality is good.

Missouri.—The amount of wheat crop in this State is not fully known, but it will generally compare well per acre with the other Western States.

Ohio.—The yield of wheat per acre is fully twenty per cent. less than last year, but from the increase of land cultivation, the decrease from an average crop will not exceed ten per cent.

IOWA.—The accounts from the centre of the State in regard to the wheat crop are very gloomy. The crop will hardly average ten bushels to the acre. Oats are generally a failure.

ILLINOIS.—In Southern Illinois the yield of wheat is about a fair average, rather under than over. The winter wheat has been generally successful, and spring wheat the reverse. In other parts of the State the yield will not be over half the usual crop.

INDIANA.—In Indiana the yield of wheat has been from one-half to two-thirds the average crop.

MINNESOTA.—The yield of wheat in this State is of better quality than usual, and in quantity nearly two thirds of their usual crop.

MICHIGAN.—The yield of wheat in Michigan is over two-thirds an average crop, and generally of good quality.

WISCONSIN.—The crop of wheat is up to the average, but the greater extent in cultivation compensating for any deficiency in the yield per acre.—*N. Y. Courier and Enquirer.*

IMPLEMENTS AT THE CHESTER MEETING OF THE ROYAL AGRICULTURAL SOCIETY, ENGLAND.

(*Continued from July number.*)

PORTABLE ENGINES.

The trial of the portable engines occupied several days, and was as severe in its conditions as the society could possibly impose upon this class of machinery. As the trial moreover, was triennial, according to the rules of the society, as suggested by the implement makers themselves, the results were looked forward to with more than ordinary interest, and awakened great excitement during their progress. The last trial of portable engines took place at Carlisle, when Messrs. Tuxford were the victors, as they are on the present occasion. The conditions of trial imposed by the society were framed especially to obviate the production of what are fairly termed "racing engines;" that it has been thoroughly successful on the present occasion we have no reason to doubt. At all events, it has secured the construction of simpler, and, we presume, more useful engines, such as the farmer can safely and practically work, without the apprehension of their being continually subject to the engineer's repairing powers.

The plan for testing the engines was to allot 14 lbs. of coal to the horse-power of each engine, so that an eight-horse engine had 112 lbs. of coal, and others in the same proportion. The coal, however, was not of so good a quality as that used at Carlisle, owing, in all probability, to its being supplied direct from the colliery in Wales, instead of from London, as heretofore, the latter market always securing the best quality. The steam was raised to the working pressure of 45 lbs. to the square inch. The time and the consumption of fuel were accurately noted, and the engine, after working for a short time, was left to cool down. The working parts of the engine were then taken to pieces, and the piston, slide, expansion, valve, and pump valves were examined by the judges; the engine then performed what is called its "duty," which is expressed by the work done in a given time by a certain weight of coal. The decision of the judges is determined, mainly, by "the simplicity of construction and probable durability of the engine considered as a whole and in detail, its portability, the economy of its working power, and the price." The power of the engine is ascertained by a "friction break," which resists the rotation of a drum, driven by the engine strap, and adjusted to the motion required; while the weight sustained is multiplied by the velocity of the periphery of the drum, which represents the power of the engine. The "duty," therefore, of an engine is the

amount of work obtained by consuming a given weight of fuel, and this is ascertained by loading the break-wheel with a certain number of pounds weight, proportioned to the number of revolutions per minute and to the nominal horse-power of the engine. The resistance offered by the engine is proportioned to the fuel supplied, and the longer the time run the greater the economy of working, or, in other terms, the less quantity of coal is burnt per horse-power per hour.

Though several engines were disqualified from competing by not complying with the "conditions" imposed by the society, there were 32 portables and 16 fixed submitted to trial, and the whole number on the ground of both classes amounted to 105. The number of exhibitors of these engines was 39. The following are the results of the trials, as measured by mechanical time :—

	hrs.	min.
Brown and May	2	35
Fowler and M'Collins	1	43½
Butlin	1	14½
Wm. Clay	1	29
Haywood	2	0
Foster	1	34
Maggs	1	27½
Tuxford and Sons	3	34½
Hornsby and Sons	2	40
Clayton and Shuttleworth	3	7
Ransome and Sims	2	35

Messrs. Barrett and Exall and Messrs. Garrett and Sons were disqualified. The time in getting up steam varied according to the "water-space" in the boiler; and if means were taken to measure the quantity required for filling, the fuel allowed for getting up the steam should be proportioned to the quantity of water to be heated.

THE TWELVE-HORSE ENGINES.

	hrs.	min.
Tuxford and Sons	2	57
Hornsby and Sons	2	25
Ransome and Sims	2	29
Clayton and Shuttleworth	2	41

It is necessary to remark that a lump of coal, apportioned to Messrs. Tuxford, turned out slaty, which necessarily interfered with the strength of their working power.

FIXED ENGINES.

The fixed engines were tried by the society's own boiler, and exhibited the following results :—

	hrs.	min.
Maggs'	1	28
Johnson	1	54
Ransome and Sims	2	7
Nash	1	25
Brown and Mag	1	45
Ferrabee	2	2
Hornsby and Sons	2	9
Clayton and Shuttleworth	1	54
Barrett, Exall, and Co	3	0

The longest time run was somewhat short of that at the Carlisle trial, owing to the regulations of the society, regarding the tubes, and also in the latter diminishing the quantity of wood, 6½ lbs. per horse power, for lighting up.

The trials, as we have said, were conducted in as strict a manner as possible, and it is rather remarkable that the three manufacturers who competed at Carlisle held precisely the same position as on that occasion. The success of the prize-engine, however, was then attributed to the number of its tubes, and it is worthy of remark, that the one which has obtained the prize on the present occasion has only half the number, though in almost every other respect it is the same in construction. The peculiarity of Messrs. Tuxford's engine consists in the cylinder being vertical, which obviates the oval wearing of horizontal ones, and the working parts are inclosed in an iron case at one end of the boiler, which keeps them free from dust when not in use. The tubes were limited to two and a-half inches internal diameter; and Messrs. Tuxford put on theirs what is called a "bush," which exposes a curved surface, on which the flame impinges, thus effectually protecting the ends of the tubes, which on the usual plan, so rapidly wear away. This invention justly abstracted the attention of the leading engineers present. Clayton and Shuttleworth's engine has the cylinder placed in the smoke-box, which keeps the latter at a high temperature, while that of Hornsby and Sons has the cylinder in the steam-chamber, above the fire-box, for the same purpose, these arrangements being made to economise fuel and avoid the inconvenience of frosty weather.

CROSSKILL'S BONE MILL.

This mill attracted considerable attention, from the circumstance of bone-dust being largely used in Cheshire and the dairy-farming districts for manure. The mill is simple in its construction, and is certainly a strong, powerful, and compact machine; it is furnished with two pairs of rollers, made of case-hardened wrought-iron cutters, for grinding the bones, and a revolving riddle for collecting the dust, and half-inch bones, as they leave the cutters. This mill was firmly bolted to a strong foundation plate; it has a friction sheave for preventing accidents to the cutters, and is provided with extra shafts, driving gear, and fly-wheel, for receiving the strap from a portable engine. When attached to a ten-horse power steam-engine, or water-wheel, the mill will grind and dress from 30 to 40 tons per day.

CHAFF CUTTERS.

The trial of the chaff cutters seemed to excite the attention of visitors just as keenly as it did that of the exhibitors. These machines were divided into two classes, one worked by hand and the other by steam. There were 12 chaff cutters tried by steam, and seven by hand power, both classes being tested by the dynamometer. The conditions of the trial were that the chaff must be cut three-eighths of an inch in length, and the time for cutting was restricted to three minutes. The test of excellence was, therefore, which could cut the greatest weight within the time and in the best condition. The machines varied in a few minor respects, but most of them were slight deviations from that of Corne, so long and so well known by all chaff cutters. The following were the results of the machines worked by steam :—

	Revolutions.		lb.
Smith and Ashby made	181,050	and cut	107¾
Allcock made	105,140	"	68¾
Barrett, Exall and Co. made	137,600	"	99¼
Carson made	143,200	"	114¾
Walker made	75,550	"	28
Corne made	136,650	"	127¾
Samuelson made	164,090	"	134¼
Bentall made	162,430	"	63½
Ransome and Sims made	72,660	"	152
Garrett and Sons made	132,780	"	160
Richmond and Chandler made	79,733	"	173¾

Messrs. Page, Ferrabee, and Hill and Smith were disqualified, and Messrs. Turner's choked. The first prize of £5 was awarded to Mr. James Corne, who has been successful upon more occasions than any other maker at the Royal Agricultural Society's trials, and the general character of whose implement is so well known to our readers that it may suffice simply to allude to it. We do this, however, with the greater pleasure since it has received the society's award after a very severe test, from the circumstance of Mr. Carson having impugned our judgment, and condemned inferentially our want of fairness for presuming to question the decision of the Bath and West of England Society, who awarded a prize to his chaff cutter, in preference to that of Mr. Corne. We inserted Mr. Carson's letter *in extenso*, but made no comment upon it at the time, from the conviction that the charge against our want of fairness was simply untrue, and that of defect of judgment was merely inferred and not directly made. Time, however, has set the matter perfectly at rest, and the society, by awarding to Mr. Corne the first prize for his chaff cutter, has indirectly answered every charge made against us by Mr. Carson, touching our comments upon his machine.

HAND CHAFF CUTTERS.

The following chaff cutters, were tried by hand, and produced these results. The time allowed to each machine was five minutes, and the gauge of each was to be regulated to $\frac{3}{8}$ of an inch:—

	Revolutions.		lb.
Richmond and Chandler made	18,500	and cut	24½
Turner made	20,500	"	22½
Smith and Ashby made	19,800	"	20¾
Page made	19,575	"	24½
Mellard made	18,420	"	15
Hill and Smith made	20,410	"	23½
Ransome and Sims made	16,960	"	25½
Barrett, Exall and Co. made	16,100	"	19½

The judges then caused steam power to be applied to the dynamometer, and the instruments to be tested. Considerable delay occurred in the adjustment of the machinery, and Messrs. Ransomes and Sims first came forward with two of their horizontal root cutters; but these from some cause or other speedily became choked. The manager was not, however, to be thwarted, having great confidence in his machines, and the principle upon which they were worked. He tried a third, and this in the time allotted to each machine (three minutes) produced 314¾ lb. with a power of 65,826 lb.

The same machine was then reversed for slicing with the following result: power 44,720 lb.; produce, 638¾ lb.

B. Samuelson.—A patent Gardner's double-action turnip-cutter. This machine has 54 knives to cut finger pieces for sheep, and four slicing knives for cattle. For finger pieces, the power used was 154,175 lb.; produce, 836¾ lb.

The same reversed for slicing: power, 142,720; produce 11 cwt. 1 qr. 17½ lb.

G. H. Bentall.—A patent prize root pulper; power, 164,490 lb.; produce, 490½ lb.

Barnard and Bishop.—A patent root pulper. No register could be kept of the power used by this machine; the produce was 429¼ lb.

James Woods and Sons.—A universal mill for grinding and crushing; power, 96,120; produce, 210¾ lb.

B. Samuelson.—An improved root pulper; power, 134,200; produce, 249½ lb.

TRIALS OF OILCAKE BREAKERS.

This class of instruments was also tried by the dynamometer.

The first trial was with a cake break, made entirely of iron, of Ransomes and Sims. The time allotted to each implement was (with two exceptions) three minutes; power, 5220 lb.; produce, 8½ lb. coarse, 1½ lb. fine.

E. H. Bentall.—An improved forge oilcake mill; power, 6830 lb.; produce, 30 lb. coarse, 5¼ lb. fine.

B. Samuelson.—A linseed cake breaking machine, regulated by an eccentric, for beasts or sheep; power, 11,380 lb.; produce, 51½ lb. the coarse, 3½ lb. the fine.

Smith and Ashby.—A registered oilcake mill, with double action for sheep and oxen. This, with the implement used in the next trial belonging to the same firm, was worked for five minutes, which will account for the great power used, and the larger produce resulting; power, 30,500 lb., produce, 106¼ lb. coarse, 22½ lb. fine.

A registered double action oilcake mill, similar to the last, but larger and fitted to work by power as well as by hand; power, 10,720 lb.; produce, 84¾ lb. coarse, 7½ lb. fine.

James Holland.—A cake breaking machine, regulated by an eccentric, for beasts and sheep; power, 9920 lb.; produce, 24½ lb.

An improved oilcake breaker for beasts, sheep, and lambs, capable of being altered to powers, different sizes; power, 6215 lb.; produce, 35 lb. coarse, 1½ lb. fine.

E. H. and T. Turner.—A roller mill for crushing linseed, &c., connection of a large and small roller acting in contact with each other; power, 30¾ lb.

Garrett and Sons.—An oilcake breaker for common cake; power, 12,650 lb.; produce, 56¼ lb.

Arthur Jilcosh.—An oilcake crusher, composed of a cylinder formed of separate toothed rings or wheels, with toothed plates on either side, the one having fine and the other coarse teeth; power 37,930; produce 14 lb. coarse, 15½ lb. fine.

W. Newzam Nicholson.—A machine for breaking oilcake for beasts and sheep; power, 4530; produce 36 lb. coarse, 2½ fine.

Messrs. Ransomes and Sims came on the ground again with the same Biddell's patent root-cutter, as was tested in the second trial on Friday, being anxious to have the merits of the implement more completely ascertained. The time allowed was three minutes; power, 14,080; produce 48 lb.

B. Samuelson.—This machine had also been tried before (No. 9 on Friday), and was now again placed in competition with that of Messrs. Ransomes and Sims; the result was, power, 16,040; produce 53½ lb.

An arrangement was made by the stewards that the breakers should be subjected to three separate tests, three minutes being given for the fine quality; two minutes for the quality used for sheep; and one minute for that used for cattle.

Ransomes and Sims.—A cake breaker; power, 98,600 lb.; produce, 40½ lb. Second trial; power, 20,820 lb.: produce, 72 lb. Third trial; machine broke down.

Barnard and Maynard.—An oilcake crusher for steam power. First trial as registered. Second best; power, 42,035 lb.; produce, 157⅛ lb. Third trial: power, 31,050 lb.; produce, 108 lb.

Arthur Silcock.—An oilcake crusher; machine broke down.

Richard Hornsby and Sons.—A double cake breaking machine. First trial:

power, 92,296 lb.; produce, 150 lb. Second trial; power, 32,100 lb.; produce, 101 lb. Third trial: power, 17,600 lb.; produce, 114½ lb.

Barrett, Exall, and Andrews.—First trial: power, 12,800; produce, 154½ lb. Second trial: power not registered, produce, 117 lb. Third trial: power, 16,575 lb.; produce, 59 lb.

W. L. Fisher.—First trial: power, 114,730; produce, 147½ lb. Second trial: power, 52,680; produce, 153 lb. Third trial: power, 18,140 lb.; produce, 61 lb.

W. R. Nicholson.—First trial: power, 14,300 lb.; produce, 129 lb. Second trial: power, 16,720; produce, 93 lb. Third trial: power, 6320; produce, 88½ lb.

E. H. Bentall.—First trial: power, 124,350; produce, 164¾. Second trial: power, 49,110; produce, 165½ lb. Third trial: power, 27,190; produce, 124½ lb.

TRIAL OF ROOT CUTTERS AND PULPERS.

Some rather interesting trials of the cutters and pulpers were made, in order to test their capabilities when worked by hand power. The instrument used for testing these implements was Amos' dynamometer, which calculated the force necessary to propel them, and the proportionate produce resulting in a given time. The dynamometer, when in operation, marks exactly 32½ revolutions per minute, and also gives the pounds weight which an implement is capable of raising one foot high. Of course, experiments like these were chiefly interesting to scientific men, and those experienced in, and practising the manufacture of the implements in question; and these gentlemen entered very warmly and spiritedly into the excitement of the scientific contest. Here, we may remark, is one amongst the many other proofs of the benefits conferred by this society, and the numerous kindred societies of which it is now the chief, if not the progenitor. In fact, here is the arena of the magi of the mechanical world—the stage on which men of genius meet to compare notes, and to reap the advantages of experience, and the reward of inventive talent. Here are to be seen the mechanical forces in all their applications and modifications—in the screw, the wheel, the lever, &c., utilised by the skill of the cunning craftsman, and easily overcoming what heretofore seemed insurmountable obstacles, and placing within the reach of all cultivators of our mother earth the means of enhancing her many rich and life-sustaining gifts.

The first implement subjected to trial was Biddell's patent root-cutter. It indicated, in two minutes, power to raise 22,500 lb. when cutting finger pieces for sheep, and cut 93½ lb. The gearing, on being reversed so as to cut slices for cattle, gave the following results:—

	Power.		Time.
Biddell's patent root-cutter....	16,030 lb.;	produce 145½ lb.	2 min.
Biddell's do. do. reversed.	22,195 lb.	do. 79 "	3 "
Warner's turnip-cutter.....	25,400 lb.	do. 167¾ "	2 "
Gardener's turnip-cutter.....	8,090 lb.	finger pieces for sheep. 101 "	2 "
Do. reversed (Samuelson's)..	9,220 lb.	slices for cattle. 116 "	2 "
Do. altered do. ..	5,790 lb.	small finger pieces, lambs 37¾ "	2 "

Mr. Ransome here objected that, theoretically, the cutting for sheep ought to take more power than for cattle. This had just happened the reverse way, the trial for cattle having taken more power than for sheep. A repetition of the 5th trial was, therefore, made with the following result:—Time, two minutes;

power, 10,700; produce, 98¾ lb. It will be observed that this shows just 15 per cent. more power, and 15 per cent. less in weight. This was accounted for by some difference in the style or rapidity of feeding, though some gentlemen seemed to think that so different a result somewhat compromised the validity and worth of the test.

B. Samuelson.—An improved root pulper. This instrument is used for mincing roots to mix with chaff for cattle and with meal for pigs. The operation is necessarily slower, and the power required greater, the finer the produce is comminuted. On being put to the test it was ascertained that a mistake had been made, and an implement requiring steam power instead of to be worked by horse power had been brought on the ground.

T. Brewer's patent disc pulper.—Time, three minutes; power, 11,470 lb.; produce, 36¼ lb.

William Goulding and Co.—A root pulper. Time, three minutes; power, 30,420 lb.; produce, 100 lb.

E. H. Bentall.—A root pulper. Time, three minutes; power, 23,100 lb.; produce, 72 lb.

Carson.—Moody's patent turnip cutter. Time, two minutes; power, 14,700 lb.; produce, 138 lb.

B. Samuelson.—A patent disc root pulper invented by Thos. Brewer, of Banbury. Time, three minutes, power, 30,150 lb.; produce, 62 lb.

James Woods and Son.—A patent root mincer and pulper, invented by Fred. Philips, of Brandon. Time, three minutes; power, 24,300 lb.; produce, 52½ lb.

Barnard and Bsihop.—A patent root pulper. Time, three minutes; power, 31,945 lb.; produce, 89 lb.

Barnard and Bishop.—A root grater or turnip cutter. Time, two minutes; power, 11,520 lb.; produce, 142¾ lb.

Pickerley, Jones and Co.—An improved turnip slicer. Time, two minutes; power, 9300 lb.; produce, 97¼ lb.

James Woods and Son.—A patent root mincer and pulper, invented by Fred. Phillips, of Brandon. Time, three minutes; power, 26,310 lb.; produce, 52¾ lb.

Same machine, reversed.—Time, three minutes; power, 18,680 lb.; produce, 66 lb.

Albert and Theodore Fry.—A root grater, invented by Bushe and Barter, of Lixmore and Blarney. Time, three minutes; power, 38,400 lb.; produce, 89¾ lb.

THRASHING MACHINES.

The trial of the thrashing machines was as severe as could possibly be imposed, and excited unusual interest both amongst the exhibitors and the ordinary visitors. These trials lasted three days. About 100 machines, combined or otherwise, were entered for exhibition, the majority of them being based upon the same principles of construction, with variation of working details, and most of them aiming at both thrashing the corn and cleaning it ready for market. All the first-class manufacturers were efficiently represented, and each apparently did his best to be successful in the trials. Each machine had 150 sheaves of wheat served out to it, and many of them 60 of barley, and the time taken to thrash the quantities, and the relative cleanness of separation of the different qualities of the grain were the tests imposed upon the machines. The following results were obtained :—

	Sheaves of wheat.	Minutes.
Hayward's machines	—	Choked.
Ransoms and Sims	150	11
" " Barley.	60	5
Nalder	150	9
Roby and Co	150	12
Savory	150	14
Holmes	150	9
Barrett, Exall, and Co	150	12½
" " Barley.	60	4
Cambridge	150	12½
Humphries	150	13
" Barley.	60	5
Clayton and Shuttleworth	150	13
" " Barley.	60	7
Fowler and M'Collin	150	11
Garrat and Sons	150	17½
Harts and Gibbon	150	13½
Hornsby and Sons	150	16½
" " Barley.	60	6½
Tuxford and Co.	150	14
" " Barley.	60	6½
Gilbert	150	12¼
Foster	150	13

SINGLE BLAST MACHINES, PREPARING THE CORN FOR DRESSING.

	Sheaves.	m. s.
Ransomes and Co	150	12.30
Barrett, Exall, and Co	150	11.20
Humphries	150	12.30
Smith	150	9.30
Clayton and Shuttleworth	150	15.45
Garrett and Co.	150	11.30
Hornsby and Co.	150	11.15

A subsequent trial took place of the following four engines, which produced these results. 800 sheaves of wheat were told out to each machine, 25 for setting it to work, and 775 to test its working capacity :—

	Sheaves.	Minutes.
Hornsby and Sons	775	43½
Clayton and Shuttleworth	775	43½
Ransomes and Sims	775	47
Humphries	775	61

THE WINE OF 1858—We have just received a letter from Segni, a remote interior town of the papal dominions, in which it is stated that for the first time in many years the vines show no traces of oidium, or grape disease, and that the vintage will be enormous. Indications of the same are to be found in The Independence Belge and the German foreign items for nearly all the continent. The traffic in cheap Hungarian wines, which has been very much stimulated of late years, and which draws its resources from a limitless supply of excellent varieties, rapidly becoming well known, will contribute to depress the price, so that there is a possibility of foreign wines again sinking to the old level.—*Philadelphia Bulletin.*

COST OF UNDERDRAINING.—On "the Premium Farm of the Empire State," there are sixty-one miles of underdrains, all laid by the present proprietor, R. J. Swan, of Rose Hill, near Geneva. The cost has been much less than usual, as drains from two and a-half to three feet deep have been laid complete at an expense of 28½ cents per rod. Digging, 12½ cents; laying the tiles and filling the drains with plows, 3 cents; average cost of tiles and cartage, 13 cents. The tiles alone frequently cost 25 cents per rod, freight included.

DISEASES OF THE SHEEP.

Continued from page 168.

Inflammation of the Brain is sometimes produced by excess of nourishment, particularly if the alteration from poor to rich food is sudden. The symptoms are of extreme violence: the motions of the animal sometimes assume a ridiculous form. The treatment should be prompt: the vein of the neck (the jugular) should be opened, and from half a pound to a pound of blood abstracted, and a purgative, such as two ounces of sulphate of magnesia, administered. In the lamb, the dose as well as the bleeding, will be less in proportion.

Louping-Ill.—A disease attacking sheep and lambs in the spring; rare in England, but common in Scotland, occurring when dry, frosty, and easterly winds prevail.—Symptoms.—Dulness, deadness of coat, loss of power of one or both sides, tremblings, contractions of the gullet, convulsive fits, disturbed breathing, gnashing of teeth and foaming of the mouth, and a sidelong motion of the body. Treatment.—Immediate and copious bleeding from the neck, followed by purgative medicines.

Turn-sick, Giddiness.—The sheep appears dull and moping, is unsteady in his motions, and, after some time, moves round in a circle. Treatment.—If any soft place can be felt on the surface of the skull, the hydatid may be penetrated by means of a common awl, and relief has in some instances been afforded. In others, the operation of trephining has been had recourse to with success. Unless a soft place can be felt on the surface, when the awl or trephine may be used, it is better to confine the sheep, and, by means of cut food and oil-cake, get it fit for the butcher.

Obstructions in the Gullet are less frequent in the sheep than in the ox. Treatment.—The probang, previously oiled, should be passed into the gullet over the root of the tongue—the head of the sheep being elevated, and held firmly between another man's knees.

Hoove, Hoven, Blasting, are terms given to the distention of the rumen with gas, caused by the fermentation of the food. The treatment must be prompt, in order to be successful. If the hollow probang is at hand, it may at once be passed into the rumen, and so allow the gases to escape through it; or, if nothing else is at hand, a dessert-spoonful of salt may be dissolved and poured into the throat; or, better still, a drachm or more of chloride of lime, dissolved in water. This is more particularly called for if the putrefactive process is commenced; whilst, in the early stage, two to four drachms of hartshorn in half a pint of warm water will often give relief. Sulphuric ether, in doses of two drachms, is also a very effectual remedy. In some cases there is no time to administer medicine, but it is necessary to plunge a trochar or a penknife into the rumen, through the flank. If the latter is employed, a small tube, such as a quill, should be kept in the wound, so as to admit the escape of the gas, which, when the trochar is employed, is effected by the canula, which accompanies it. After-treatment is often requisite, as indigestion sometimes succeeds, as well as subacute hoove. The following draught will be useful:—

Sulphate of magnesia	2 ounces.
Gentian	1 drachm.
Ginger	2 drachms.
Chloride of lime	1 scruple.

Dissolve in warm water or gruel.

Great caution should also be used with regard to the diet; and, by way of preventive, it will be an excellent plan to sprinkle any luxuriant herbage with salt previous to sheep being turned on it.

Poisons.—Great losses have sometimes occurred from sheep partaking largely of indigestible or deleterious matters. The treatment in these cases should be the administration, as soon as possible, of large doses of linseed oil, so as at once to sheathe the coats of the stomachs, and get rid of the offended objects by purgation.

Diarrhœa.—In some places a cure is effected by turning the sheep into a pasture abounding with common tormentil or septfoil. By way of medicine, the following will be found a very suitable mixture:—

Catechu, powdered	4 drachms.
Prepared chalk, powdered	1 ounce.
Ginger, powdered	2 drachms.
Opium, powdered	½ drachm.

To be mixed with half a pint of peppermint water, and given twice a-day; two or three table-spoonfuls being a dose for a sheep, and half this quantity for a lamb. Lambs are probably more subject to diarrhœa than sheep. If the looseness is moderate, it may pass off without injury, but if it continue, recourse should be had to treatment. It will sometimes be prudent to administer a little opening medicine, such as two drams of Epsom salts, to clear out the intestines previous to the cordial medicine above mentioned, which will generally succeed.—The *White Skit*, so called from the pale colour of the fæces, is a more dangerous disease, and its danger does not arise from looseness, but rather from constipation, being, in fact, owing to coagulation of the milk in the fourth stomach. The treatment must consist in the administration of alkalies, their property being to dissolve the hardened mass. Half an ounce of magnesia dissolved in water, or a quarter of an ounce of hartshorn diffused in water, or both these medicines combined in less quantities, should be given and repeated, and followed with Epsom salts, after which a little of the cordial medicine may be given. It will be desirable to give the above medicines in a large quantity of water.

Braxy is a much more serious disease than diarrhœa, being inflammation of the coats of the intestines. It is, however, often preceded by diarrhœa, and attended by fever and constitutional disturbance. A sudden change of pasturage, more particularly from a succulent to a dry and high pasture, is one of the most frequent causes, and to this may be added exposure to wet and cold after travelling. The dung is hard and scanty, though frequently discharged, and covered with mucus and blood, with an offensive smell. The fætor increases as the disease progresses, and often becomes fatal in the course of a few days; when the intestines, particularly the large, are found in a state of great inflammation, and even ulceration. Treatment.—Linseed gruel should be given several times a-day, so as to lubricate the intestines, as well as to afford some nourishment; and the following medicine should be administered:—

Linseed oil.....2 ounces.
Powdered opium.....2 grains.
With linseed tea.

The following day the opium may be repeated, with a scruple of powdered ginger and two scruples of gentian, and the oil may be again administered if required. In some instances the following treatment has been adopted with success:—Bleeding, in the first instance, from the neck or the fore-leg, after which an ounce of sulphate of magnesia, and the following day five grains of ipecacuanha, repeated two or three times, with intervals of two or three hours.

Spasmodic Colic sometime attacks lambs, but rarely sheep. The symptoms are those of severe pain—not continued, but in paroxysms. Treatment.—The following should be administered slowly and carefully:—

Tincture of opium.....1 drachm.
Powdered ginger.....1 "
Epsom salts.....4 drachms.
Dissolved in warm water or gruel.

Double this quantity may be given to a full-grown sheep. To be repeated without the salts, if required.

Redwater, in sheep, consists of an effusion of red serum or water in the abdomen, outside the bowels, produced by an increased action of the vessels of the peritoneum, or serous membrane, which lines the abdomen internally, and the bowels, &c., externally. It is very common with young lambs before they are weaned, as well as afterwards, and sheep are also sometimes affected. It will generally be advisable to kill the animal affected, if in any condition for the butcher; but where treatment is employed, the following will be a desirable medicine:—

Sulphate of magnesia.....1 pound.
Ginger, powdered.....1 ounce.
Gentian, powdered.....1 "
Opium, powdered.....½ drachm.
Dissolved in warm water or gruel.

This medicine will be sufficient for eight or ten sheep, or double the number of lambs. The flock attacked by this disease should, if possible, be removed from the turnip field, or only allowed to remain there during a portion of the day.

Catarrh.—Sheep are very liable to catarrh at the fall of the year, and particularly if the season is unduly wet. Every severe case should be met with more shelter and good nursing. This alone, with the assistance of a little gruel, will often effect a cure; but if the symptoms are more severe, half an ounce of Epsom salts, a drachm each of nitre and of ginger, and half a drachm of tartarized antimony may be given, dissolved in gruel. In still more severe cases, where any of the sheep have been lost, or inflammation of the lungs is threatened, bleeding from the neck should be practised.

Bronchitis.—Sheep are less liable to attacks of bronchitis than cattle, but should be treated when affected in a similar manner; and also when bronchitis or hoove is produced by the presence of worms in the windpipe. Half a pint of lime water, and a quarter of a pint for a lamb, should be given in the morning and in the evening; or two tea-spoonfuls of salt dissolved in water, continuing the treatment for a week.

Inflammation of the Lungs occasionally occurs, and seems peculiar to certain localities, such as low and damp situations. The treatment in these diseases should almost invariably commence with copious bleeding, which, however, is demanded more; and can be better borne, in pleurisy than in the other diseases of the lungs. In addition to bleeding from the neck, purgatives should be given, and followed by sedative medicine, such as nitrate of potash, tartarized antimony, and ipecacuanha; one drachm of the first, ten grains of the second, and five grains of the third, will be a daily dose for a sheep. Setons may also be inserted in the brisket.

Diseases of the Skin.—The *Scab* is analogous to the itch in man and the mange in horses; being, in fact, like these diseases, usually propagated by contagion, although poverty and filth will also produce it. It is essentially owing to the presence of minute insects called *acari*, which burrow under the skin, and produce excessive irritation, causing the animal to seek relief by rubbing against any hard object. This friction removes the wool, and the labor of rubbing and the irritation causes the animal to lose flesh, and thus it becomes a miserable object. The sheep begins to rub about twelve days after the infection has been received, and at this time hard pimples will be formed, and the skin feels rough. The pustules are usually broken by rubbing in the course of a few days, and the acrid fluid which escapes, dries and forms a scab, whence the disease receives its designation. If this scab is rubbed off, a sore is left, which spreads in time over a good portion of the body, the wool being of course denuded. The *acari* are of both sexes, and the females are extremely prolific, so that the least infection is very soon spread amongst a flock. It is therefore of much importance to attack the disease at the onset, and by destroying the insect, remove the disease itself. Treatment.—Various medicines have this effect; but the great difficulty is in applying them to the root of the evil. Sulphur and oil of tar form a good specific for the mange in horses; but it is very difficult to apply it to the woolly covering of the sheep. The following will be suitable forms, if it can be applied:—

Lard or palm oil	2 pounds
Oil of tar	½ pound.
Sulphur	1 "

The two latter ingredients being first mixed together, the former should be rubbed down with it. If the mixture is required to be in a more liquid state, linseed or fish oil can be used, instead of a portion of the lard. Tobacco-water is a very good application; but the high duty on the article renders it very expensive. Mercurial ointment has also been used with success; but it requires caution, and too much should not be used at one time. When used, it should be diluted with several proportions of lard, and should be rubbed into the skin in lines about four inches apart. The most convenient mode of treatment, though not the most effectual, is to dip the sheep in a solution of arsenic, which also contains some sulphur. The composition used to destroy ticks will answer the purpose. It is well to dip suspected sheep, even when the ointment is applied to decided cases. The following forms a very effectual and powerful application, but it should be used cautiously:—

White hellebore	12 ounces.
Bichloride of mercury	8 "
Rosin	1 pound.
Sulphur	1 "
Tallow	2 pounds.
Whale oil	6 gallons.

The two first ingredients should be mixed with a little oil, and the remainder being melted, the whole should be mixed together.

The Tick.—This well-known insect propagates rapidly, and would prove very irritating and injurious to sheep, were it not for the now almost invariable custom of dipping sheep and lambs every year—the ewes just after they are shorn, and the lambs at the same time, so as not to allow them to communicate the insect to the ewe again.

The Rot consists essentially in the presence of certain parasites, called *flukes*, which are found floating about the biliary ducts, apparently feeding on the bile, and preventing it from fulfilling its destined functions in the animal economy. The first symptoms of rot are not alarming, but a diminished appetite, loss of flesh, paleness of the membranes, flabby feeling of the limbs, and loss of wool, are sufficient indications of the existence of the malady. With regard to remedial measures, the most useful are those of a preventive kind; for when the disease is established, all we can do is to hurry on the fatting process, by means of the most nutritious food, such as oil-cake and linseed, with the daily addition of salt. The latter medicament, indeed, has to a certain extent, a remedial effect; for sheep have been found to improve so much whilst under its influence, that hopes have been entertained that it would prove a specific altogether.

Foot-rot is owing to the exposure of the hoof to a greater amount of moisture, and for a longer period, than the nature or structure of the foot of the sheep is adapted.—The treatment indicated is to protect the feet from moisture; to pare away the rugged parts of the foot, carefully removing any portion partially detached, and then to apply a stimulant, or even a caustic, to the denuded part, so as to induce healthy action. If matter has formed, an exit should be afforded for its escape, but the quick should not be unnecessarily exposed. The following will be found a very useful and successful application to the foot, after it has been pared; and it has this advantage over many other applications, that it not only represses diseased secretion, but promotes healthy action; and while it encourages the growth of horn, it protects the foot, for a certain time, from the access of moisture:—

Tar	8 ounces.
Lard	4 "

To be melted together; then add, slowly and carefully—

Oil of turpentine	½ ounce.
Sulphuric acid, by measure	½ "

When a caustic is required (and sometimes a single application, at first, is very good treatment), the muriate of antimony is a convenient and suitable application, when applied with a feather, and the foot afterwards anointed with tar, combined with grease. Equal parts of hydrochloric acid and tincture of myrrh and aloes have also been used with success. In order to protect the feet from undue moisture, and even after the disease has appeared, it is a very good plan to cause the sheep to walk every day over a dry and smooth surface, on which lime has been thickly strewed. Sheep are liable to injuries of the feet, which somewhat resemble the foot-rot; such as soreness from travelling, and irritation of the biflex canal between the claws. The treatment should be somewhat similar to that recommended as foot-rot.

Vitality of Garden Seeds.—As some inquiries have been made recently in regard to the vitality of garden seeds, we quote from a letter sent us several year since, by a curious and intelligent horticulturalist in Canada West:—"The vitality of seed I find of greater duration than is usually supposed; but then, it must be saved with some degree of care. To prevent any mistake, I always label the year in which the seed is gathered. On referring to my book, I observe that I sowed in 1851 double curled Parsley and Asparagus Beans, the produce of 1845; and on the 24th of May, 1850, yellow turnip Radish of 1839. On the 25th of August, 1851, I sowed black Spanish Radish seed gathered in 1838. On the 30th of the same month these Radishes appeared above ground, and there is this observation in the margin:—'The Radishes of 1838 grew very well.' This season was very dry but the radishes were watered."—*Rural New Yorker.*

THE PROGRESS OF ENGLISH AGRICULTURE.

(*Continued from Page* 163.)

A new system of fattening sheep, which has been attended with wonderful results, was commenced in 1824, on the suggestion of Mr. Coke's steward, Blaikie, by Mr. John Hudson, now known throughout England in connexion with his present farm of Castle Acre. He ventured to supply his young wethers with sliced turnips and purchased oil-cake. Such was the success of his experiment, 'that, to Mr. Coke's astonishment, when he asked to see the produce of his tup, he found they had been sent fat to market twelve months before the usual time.' Yet all John Hudson's neighbours, including his father, a man of agricultural progress, prophesied his ruin from his extravagance in buying food for sheep, which was regarded in much the same light in farming, as for a young spendthrift to go for money to the Jews. At the present day the purchase of linseed-cake, or meal, or foreign pulse, is one of the regular means by which an increased quantity of meat is manufactured. Wherever turnips are grown and sliced, there cake-troughs are to be seen, and the improved feeding, coupled with the natural tendency of the improved breeds to early maturity, has multiplied to an enormous extent the amount of mutton produced Mr. Morgan states that twenty years ago the majority of the sheep brought to Smithfield Market were three and four years old, and it was difficult to find a score under two. Now a three-year old sheep is scarcely to be met with, and fat sheep only a twelvemonth old are plentiful. Besides the vast increase in the numbers kept, we have thus three generations got ready for our tables in the same space of time as we had one in 1838. Bought food would have been wasted on the former slow-growing species; but applied to the improved stock bred on Bakewell's principles, it created a demand not only for tups from Sussex, steers from the Quantock hills, and oilcake from Germany, but for improved implements and machinery—the turnip-slicer, the cake-crusher, the chaff-cutter, and the bone-mill, as well as the drill, horse-hoe, heavy roller, and better-contrived ploughs and harrows.

The Leicester breed was for some time adopted by Mr. Coke. He afterwards substituted the Southdowns as superior; and the perfecting of these in the present generation by Mr. Jonas Webb, may be said to have been due to one of those trivial circumstances that are always influencing the events of the world. His grandfather was a breeder of Norfolk rams, and it was the amusement of the old gentleman at his annual sales, to set his grandsons to ride on his tups, holding fast by their huge horns. It was during the races on these sharp-backed animals that Jonas determined, as soon as he was a man, to breed sheep with "better *saddles* of mutton." A lean, hurdle-backed, black-faced Norfolk ram, and the beautiful firkin-bodied Southdown, for which Mr. Webb refused five hundred guineas at the Paris Exhibition of 1856, are the two extremes, the two mutton-marks between the boyhood and manhood of the same individual. Nothing but the Norfolk sheep could have found a living on the uncultivated Norfolk heaths; nothing but the "roots," artificial grasses, cake, and corn of modern days, could have raised the Babraham "Downs" to their marvellous perfection.

Another instance of a different kind, and one in which extremes meet, marks the contrast between the past and the present. Mr. Coke's first agricultural adviser was a Mr. Overman, of Dutch descent, whose sons are still tenant-farmers on the Holkham estate, and prize-winners at Royal Agricultural and Smithfield fat-stock shows. The heads of the covenants were drawn, at Mr. Coke's request, by Overman, and only restrained tenants, in obedience to the famous Norfolk

rotation, from growing two consecutive corn crops. Now, after a lapse of eighty years, the second Earl of Leicester wisely encourages his tenants to return to the once justly condemned system of two white crops in succession; because the soil that in 1770 was exhausted, has, by a long course of high-farming, been rendered almost too fertile.

A complete history of English agriculture from 1750, would comprize names worthy of record from almost every county, and the name of George III. would worthily appear at the head of the list. He had a considerable practical knowledge of the science, and contributed, under the denomination of Ralph Robinson, to Young's monthly periodical, 'The Annals of Agriculture.' His devotion to the pursuit did much to recommend it to others; and he is often fondly and proudly spoken of as 'Farmer George.' But no sketch can do justice to so extensive a subject, and, for the sake of brevity and simplicity, we have purposely confined ourselves to the tillage of Norfolk, which long led the van in agriculture improvement, and where nearly all the methods which stood the test of time were early adopted. The very labours seemed animated with the same spirit as their employers, for both Young and Marshall remarked that in no part of England did the workman display an equal activity. We now arrive at a period when Norfolk no longer occupies its old position, not because it has dropped behind in the race, but because other counties have pushed forward, and the course of events are tending to equalize the arts of cultivation throughout the kingdom. This last epoch is chiefly distinguished by the immense extension of drainage, by the discovery of artificial manures, by the increased purchase of food for cattle, by the improvement of implements, and still more by the improvement of those who use them. 'It is well known,' say Sir John Sinclair, 'that the best cultivated districts are those which possess the greatest facility of internal communication, without which, agriculture languishes in the most fruitful soil, and with it, the most ungrateful soil soon becomes fertile.' The effect which railroads have produced upon farming is a signal illustration of the justice of this remark, for without their aid the larger portion of the recent progress would have been impossible. They furnish cheap and rapid conveyance for goods which were too bulky to admit of free interchange in the days of horse-power—for corn and cattle, coal, iron and timber, implements and machinery, oil-cake and artificial manures—all that a farmer has to sell or wants to buy—and, above all, for the farmer himself, who brings home with him new ideas as well as new inventions. The railways practically converted distant rural parishes into the suburbs of towns, and thus inoculate them with a spirit of inquiry and commercial enterprise which could never have existed under packhorse or waggon communication. Wesley, who had a wide experience of the different classes in England, thought the tenantry the most ignorant, stupid, and unfeeling part of the community. 'In general,' he added, 'their life is supremely dull, and it is usually unhappy, too; for of all people in the kingdom, they are the most discontented, seldom satisfied either with God or man.' Wilkes said that, reversing Pope's Maxim, they held that 'Whatever is, is *wrong*.' Wesley, however, was mistaken both in supposing that husbandry was a dull occupation, and in imagining that the grumbling of the husbandmen, which was chiefly designed to keep down rents, was the real measure of their discontent; but, taken as a body, they neither read nor thought, were sluggish in their minds, and the slaves of an antiquated routine. The suddenness with which the many have displayed the aptitude which formerly was the prerogative of a few, is without a parallel in the annals of farming.

The starting point of the new era may be dated from the years 1837 and 1838, which were signalized by the foundation of the Royal Agricultural Society of England. This now famous association was suggested in a pamphlet published

in 1837 by the late Henry Handley, M.P., a fine specimen of a Lincolnshire squire—a good sportsman, an excellent judge of stock, and cultivating his own estate with more intelligence and success than was usual at that time among his class. The first annual encampment of the society took place at Oxford in 1839, and its first Journal was published in 1840 under the admirable editorship of the late Philip Pusey, a lively and forcible writer, and a most zealous farmer, who to the day of his death in 1854 devoted his time, his talents and his fortune to promoting the improvement and recording the progress of his favourite science. He was an example of that delightful combination of scholarship and practical energy which is so commmon in England, and he exercised the double influence of an accomplished gentleman and an enlightened agriculturist.

In every institution which meets with distinguished success results are always produced which were not anticipated by its originators. Thus it happened that, when the Agricultural Society was founded, not one of the promoters forsaw the importance of the mechanical department. In the ten sections of the charter of incorporation defining the objects of the association, 'implements' are only incidentally referred to as one of the subjects to which men of science were to be encouraged to pay attention, in a miscellaneous paragraph, which includes 'the construction of farm-buildings,' 'the application of chemistry to the general purposes of agriculture,' 'the destruction of insects injurious to vegetable life,' 'and the eradication of weeds.' At Oxford a few manufacturers saw an opening for obtaining customers, and found their way to the show-yard in spite of the difficulties from the want of that cheap conveyance which is now common to the whole kingdom. One gold medal for a collection of implements, three silver medals and five pounds for a 'paddle-plough for raising potatoes,' were all the rewards distributed in 1839 for what was destined to be the most attractive, as well as the most useful feature of the Society's exhibitions. After the Cambridge meeting in 1840 the importance of the implements was acknowledged; and the number displayed, beginning with some 300 at Liverpool in 1841, increased at the rate of about 100 on every succeeding year, until, in 1853, at Gloucester, they reached their highest point in a total of 2000. The rise or fall of a few hundreds chiefly depends upon the importance and railway facilities of the town where the show is held, and the number of articles exhibited is less a test of the progress of mechanical invention than of the sales which are likely to be effected in any particular district. The annual show is only one of the numerous modes in which the makers advertise and display their productions. The true prize to the manufacturer is plenty of custom.

(To be Continued.)

Economy in Smoking.—A correspondent of the *Manchester Examiner* has made a discovery which will greatly promote comfort and economy in smoking, the result being achieved by a simple plan of keeping the tobacco-pipe cool. His instructions are:—Take a piece of sponge three-quarters of an inch square (in a dry state), make a small hole through the centre, then steep it in water until it becomes distended. Squeeze the water out, and put the stem of the pipe through the hole until the bowl comes in contact with the centre of the sponge. Charge the pipe, and fill the sponge with cold water, then commence smoking, and it will be found that a saving of 25 per cent. in tobacco is effected, with an improvement in the flavor.

Public Sale of Short Horns.

ON TUESDAY, October 5th, 1858, at 1 P. M., I will offer my entire herd without Reserve. This will be the first day of the New York State Fair, to be held at Syracuse. Canastota (my Railroad Station), is only one hour from Syracuse Trains stop at this Station, going East, at 8.28 A M., and 2.42 P.M.; going West at 8.23 A M. and 12.35, 3.27 and 8.10 P.M. A liberal credit will be given.

Catalogues, with full particulars, can be had at this office or of

S. P. CHAPMAN,
Clockville, Madison Co., N. Y.

J. R. PAGE, *Auctioneer*,
Lennett, Cauga Co., N. Y.

NOTICE.

THE Township of Nelson AGRICULTURAL SOCIETY will hold their ANNUAL SHOW in the Village of Wellington Square, on WEDNESDAY the 20th October next.

DAVID GHENT,
President.

Nelson, 14th Sept., 1858.

NOTICE.

THE FIRST EXHIBITION OF THE NORTH RIDING OF LEEDS AND GRENVILLE COUNTY AGRICULTURAL SOCIETY will be holden at FRANKVILLE, Township of Kitley, on the FIRST WEDNESDAY OF OCTOBER next.

GIDEON LEEHY,
President.

FRANKVILLE, Aug. 12th, 1858.

WM. SMITH,
Secretary & Treasurer

FOR SALE.

FIFTEEN THOROUGH-BRED AYRSHIRE CATTLE: BULLS, COWS AND HEIFERS of various ages. Apply to Mr. Denison, at his residence, or at the office of the Board of Agriculture.

TORONTO, August 4th, 1858

University College, Toronto.

THE Lectures in this Institution on THE SCIENCE AND PRACTICE OF AGRICULTURE, will commence on MONDAY, NOVEMBER the 1st, and will be continued (five lectures a week), till the beginning of April, 1859. Agricultural students can attend other courses, such as Chemistry, Geology and Mineralogy, Natural History, including Botany, English Language and Literature, &c., as they may desire.

Particulars may be obtained by applying either personally or by letter to PROFESSOR BUCKLAND, University College, Toronto.

TORONTO, Augu t., 1858.

THE

Canadian Agriculturist,

AND

JOURNAL OF THE BOARD OF AGRICULTURE

OF UPPER CANADA.

VOL. IX. TORONTO, SEPTEMBER, 1858. No. 9.

CHINESE SUGAR CANE.

The introduction of new plants among the cultivated products of the farm must always be regarded with peculiar interest, and when the experiments prove successful, the results assume a character of great national value and importance. Root culture, so extensively practised of late years, has, to a great extent, changed the character of our agriculture; increasing largely the amount of food, not excepting even the grain crops, without diminishing, but rather improving the productive capabilities of the soil. The adoption of the ordinary white varieties of the turnip into field culture, was a most important step to a long career of agricultural improvement, leading directly to the general introduction of those appliances and improvements, which distinguish our modern systems of practical husbandry. The Swedish variety of the turnip—denominated on this continent the ruta baga—has, to a great extent, superseded the former, it being far more nutritious, and capable of being much longer kept, while the mangel-wurzel has subsequently, in a considerable degree, outstripped both, affording on certain descriptions of soil larger returns of nutritious food to most descriptions of farm stock. And yet, more recently, the Belgian carrot, and Silesian or sugar beet, containing as they do a very large amount of saccharine matter, have in some localities been largely introduced with the most advantageous results.

Still more recently, another plant has been introduced into the husbandry of Europe and America, for which we are indebted to China, and it promises to become extensively cultivated in climates having a tolerably high summer temperature. The Sorgho, or as it is more commonly designated,—Chinese Sugar Cane,—appears to be of a nature somewhat between the ordinary sugar cane and the several varieties of maize or Indian corn. In its growth

and general appearance it resembles the latter; while in the nature and amount of sugar which it contains, it is nearly allied to the former. According to a careful French experimenter, the sorgho contains from 10 to 15 per cent of sugar, while the cane ordinarily yields from 14 to 18 per cent.

The Sorgho has been tried on a small scale within the last two or three years in various parts of Canada. Last season, owing to the prevailing wetness the temperature was peculiarly unfavorable to its ripening; but the present season has been more propitious, and we have seen several instances in which its seeds have been properly nurtured, and a very sweet syrup obtained from its juice, which could be readily converted into a very tolerable quality of crystalized sugar. Still we have serious misgivings whether this plant can be cultivated profitably so far north as this, for the purpose of sugar-making; certainly not unless cane sugar should, from some cause or other, assume a higher price in the market than it has ordinarily borne for several years past. It should be remembered that, like the sugar-cane, as the Sorgho, approaches a higher latitude, the amount of its saccharine matter diminishes. In this respect both these plants differ in toto from the Beet, which is found to contain more sugar as it advances, within certain limits, northwards. In Europe it is found not worth while to cultivate Beets for sugar manufactories, below 45 degrees of latitude, whilst in northern Russia, its juice has been found to yield from 12 to 15 or 16 per cent of sugar.

As a forage plant we believe that the Sorgho can be profitably cultivated in Canada. We find from experiments made both last year and this, that it will bear twice-cutting the season, provided it be sown in good and well prepared soil, and cut the first time early, say the beginning of August, and the aggregate amount of fodder yielded in favourable seasons will be very large.

Horses, cows and pigs, eat it with avidity in the green state, and it is consumed with much relish during winter when dried and preserved in the usual way. It has been estimated that in point of nutritious qualities, 44 tons of green Sorgho are equal to 16 tons of well made hay. In the South of France it is used for making wine, and two acres of land were found to produce 132 gallons of what is said to have been an excellent wine. In distilling, the ripe plant will produce from 7 to 10 per cent of alcohol. With these facts well ascertained, it is evident that this new importation from China promises to play no unimportant part in the improving husbandry of a considerable portion of the globe.

The Journal and Transactions.—A pressure of business in connection with the late Provincial Exhibition, has prevented the issue of the present number so early or in so complete a form as was anticipated. Future numbers will be issued as formerly, under cover, and will embody, at as early a date as possible, the official report of the Exhibition, with the Prize List, &c.

EXAMINATION PAPER IN AGRICULTURE, UNIVERSITY COLLEGE, TORONTO, 1857–8.

(*Concluded—from Page* 175.)

Question 8.—The *origin, distribution,* and *classification* of soils?

Answer.—Soils are in general derived from the rocks upon which they lie, caused by their disintegration, by the action of water, heat, or the atmosphere, or by a combination of them. Water was, and still is, a powerful agent in the distribution. Soils in general have a close relation to the underlying strata, except in drifts brought often from considerable distances. As rocks vary in their composition, so consequently do soils, which may be classified for practical purposes under light or sandy, abounding in silica; clayey, or stiff and heavy, abounding in alumina; calcareous, abounding in lime. These three minerals mainly constitute all soils, infinitely varying in their proportions. Loams are soils containing a happy combination of them, with large quantities of organic matter. These again are divided into heavy or light, just as clay or sand predominates.

Question 9.—What are the principles and uses of ordinary ploughing, subsoil, and trench ploughing, and in what conditions of the soil are the latter operations necessary?

Ordinary ploughing should be done straight and of a uniform depth, so as to turn over the furrow at a uniform angle, varying according to the purpose or nature of cropping. Ploughing disintegrates and mechanically prepares the soil for seed, which cannot germinate and progress without a loosened bed of fine earth. Subsoil ploughing breaks up the ground below the furrow of the ordinary plough, exposing a greater depth of soil to the action of air and moisture, gives the roots of plants a wider range in search of food, and allows of injurious matters in a solvent state to escape downwards. Trench ploughing brings the greater part of the subsoil to the surface, exposes it to the action of light and air, often effects beneficial, chemical and mechanical changes.

Ploughing of all kinds should be performed when the ground is dry, when the breaking up and dividing the soil is more thoroughly done, and the injury by the treading of cattle avoided. In wet land subsoil ploughing should not be done till a year, at least, after under-draining. The former on heavy lands especially, facilitates the operation of the latter.

Question 10.—Give a brief sketch of the modern improvements in Agricultural Implements and Machines.

The modern improvements of the Plough are striking and beneficial. This implement is now as varied in its construction to meet special ends, as differences of soil and variations in preparing land for different crops. The substitution of iron for wood, especially in mould boards, has proved of great benefit, while the form of the Plough has been so mechanically improved, that it is less laborious

to manage, more durable, of less weight in proportion to its increased strength, and requiring much less motive power in effecting deeper and better work.

The horse-hoe, invented by Jethro Tull, has of late years received great improvement, and is now a most useful and effective implement, quite indispensable in row or drill husbandry. Grubbers, scarifiers, clod-crushers, &c., have either been invented of late years, or so much modified and improved, that quite a new feature has been given to the practice of cultivation, which has become more clean and thorough, and the crops consequently much increased. Machines for thrashing and cleaning grain have of late received great improvement, saving power and increasing work. While the changes made of late years in the reaping machine, adapting it for mowing grass, have been on this continent most marked and beneficial, chaff-cutters and drills for sowing seed in rows have been gradually improved and introduced of late years. The introduction of steam for agricultural purposes, including ploughing, in Great Britain, and the substitution in some degree of grubbers for ploughs, may be instanced as among the most striking changes in agricultural mechanics, indicating the advent of a new era in husbandry.

Question 11.—What are the principles and benefits of Draining, in reference particularly to Canada? Open and covered drains, their depth, form, distance, inclination, materials, and cost.

Answer.—The principles upon which Draining depends, are :—

1. That water is always more or less present below the surface of the soil.

2. That the roots of plants will not penetrate this water, and consequently do not go down so far as they otherwise would in search of food, and are consequently cut off from a due supply of nourishment.

3. Air, which is essential to vegetable as well as animal life, cannot find sufficient access in soil saturated with water.

4. That *stagnant* water is always hurtful to vegetation, inducing cold by constant evaporation, and forming noxious chemical combinations in the soil.

Benefits.

1. Soils that are stiff, and therefore difficult and expensive to work, are, by under-draining, rendered dry and friable, and consequently cultivated with more certainty and less expense.

2. Larger crops and of superior quality are reaped.

3. By carrying off the superfluous water by drains, instead of the much slower process of natural evaporation, seed time, and consequently harvest, are earlier.

4. Large root crops are raised, where before only oats and the coarser grains and grasses only could be produced. Draining thus becomes essential on all wet lands, to the suceessful breeding and fattening of superior cattle and sheep.

5. Summer and naked fallows are rendered much less frequent and necessary, and an improved rotation introduced.

6. The climate is rendered more salubrious, as well as the soil improved.—As this country is opened and drained, diseases both of plants and animals are diminished.

In reference to Canada the thick and thorough system of draining practised in Britain is, perhaps, not required, or cannot be afforded. We should first get off the surface water by open drains, and afterwards make as many under-drains in the wettest portion of the farm, as circumstances allow. The more draining is practised, the better it will be understood, and the cheaper and more effectually done.

Forms of Drains.

1. Open drains merely carry off the surface water; they occupy, if large, considerable space, and are liable to fill in. But they are more or less necessary and useful, particularly in a newly settled country. The first thing to be done on many farms is to inprove the natural drainage by deepening or cutting ditches. The system can be refined by degrees.

2. Covered drains have this advantage, that they filter the water charged with manuring substances, leaving the latter available for plants, and they are not generally liable, if properly made, to get filled up.

Depth.—This should vary according to the nature of the soil and distance apart. On tenacious clays 30 or 36 inches may be sufficient. In looser soils, 4 feet. For springs much more is often required.

Form.—Gradually tapering to the bottom, which should be of sufficient width for the material to be tightly laid in.

Distance.—The distance at which drains are to be placed from each other must in great measure depend on the character of the soil, inclination of the surface, and the depth of the drains. The deeper the drain, the more water will be drawn to it. From 24 to 34 feet apart, for drains of 3 feet deep, on moderately tenacious soils, is considered sufficient. It is a good plan to put them wide apart at first, say 48 feet, and if that should prove insufficient to dry the ground perfectly, another can afterwards be made between. Pipes are the best material, and in light soils they should be fitted into collars, preventing the sand getting in at the joints. Draining in this country is an expensive operation; when better understood and practised, the expense will be much reduced. In England it costs much less—from £5 to £6 per acre. It is a permanent and most remunerating improvement, to which in this country far more attention must be given, if our agriculture is to progress.

Question 12.—Enumerate the different substances used as manures;—their properties, modes of action, and general classification.

Answer.—Manures may be divided into three great divisions:—1. *Animal;* 2. *Mineral;* 3. *Vegetable. Animal* manures consist of bones, flesh, blood, wool or hair, hoofs, horns, &c., and are exceedingly rich in nitrogen, some of them readily decompose, and therefore act quickly. *Mineral* substances which

enter as food to plants, as lime, several phosphates and sulphates, all derived from the soil. *Vegetable* matter, either in a green or decomposed state, afford many substances required by the growing crops. Science has of late instructed practice in the use of many substances as manures, which were formerly neglected. Bones and woollen rags are slow in action; but their effects are visible through a series of crops; whereas guano, rape, nitrates of potash and soda, particularly the two latter, are mainly taken up, if the season be favorable to their rapid action by the first crop.

Question 13.—What is the best practicable mode of managing and applying farm-yard manure in this country, with special reference to its liquid portion?

Answer.—Barn-yard manure should as much as possible be kept from drenching rains, and made into compost heaps, to hasten its decomposition. The liquid portion, which contains so large a quantity of saline matter in solution, should be received into tanks, where it should be allowed to ferment, and afterwards applied to the land, or the manure heap, carefully keeping it from waste. When dung is applied, it should as soon as possible be ploughed in to prevent the loss of the ammonia, a highly fertilizing material.

Question 14.—State the *principles* of *breeding*, *feeding* and *housing* of Live Stock, in reference particularly to the climate and wants of Canada; with the names and characteristics of such breeds of horses, cattle, sheep and swine as are best suited thereto.

Answer.—The first object to be kept in view in breeding the domestic animals is their general improvement and adaptation to special wants. Hence animals should be chosen for that purpose, on both sides, possessing the desired characteristics suitable to the purpose or end sought for. It requires great skill and judgment, combined with much perseverance.

In rearing it is of the utmost importance to feed young animals particularly, in a regular and liberal manner, to house them warmly, yet care must be taken to have sufficient ventilation. Stock exposed to our severe winter cold, consume a large portion of the food given them in keeping up the heat of their bodies, instead of its being converted into flesh, milk, &c. In fattening, food should be given rich in nitrogenous compounds, containing oily matter: *e. g.* oilcake, Indian corn, &c.

Of the breeds of Horses, strength combined with action is a principal point for Canada. The Suffolk Punch is strong, compact and active, and generally well suited; while the Cleveland Bay, Clyde and crosses are much esteemed In cattle the Durham or improved short horn, from its early maturity and great size, seems to be the favorite, while others prefer the Devon or Ayrshire, particularly for dairy purposes. In sheep the Leicester has hitherto been the favorite in Canada, possessing a good carcase and producing a heavy fleece; other breeds, as the Cotswolds, are beginning to attract attention. In some suitable localities the Downs are much valued. The breeds of Pigs are various, and the

coarser kinds have much declined of late years. Berkshires are commonly liked, but improved varieties of this and the Suffolk, Essex, &c., constituting smaller breeds, are of finer texture, and more suitable for domestic use.

Of the characteristics of animals, it may be observed that horses should have bright and prominent eyes, denoting spirit and eagerness in draught, to which deeply and broadly developed necks and sloping shoulders are essential. The external form of cattle should approach as near as possible a parallelogram. A delicacy of head, legs and tail, if not carried to an extreme, denotes high and useful breeding. Some have a tendency to lay on fat in lumps—particularly the Herefords—while others produce what is termed mottled meat, having the fat and lean nicely mixed in alternate layers. Some breeds, as the short horns, have a strong tendency to early maturity and fattening; others, as the Ayrshire, Alderney, &c., are usually poor and lean, but produce large quantities of rich milk. Pasture, elevation and climate are powerful modifying conditions in matters of this kind. In Canada, sheep having a large carcase and a heavy fleece pay better than the finer short-woolled, as the Merino or even Down. In the management of Live-Stock generally, liberal and systematic feeding, cleanliness and protection, are of as much consequence as good and pure breeding, and really good animals will always pay for liberal treatment.

Question 15.—What is meant by rotation of crops? Can a system of rotation be carried out in Canada? If so, what should that system be? State the rationale of the Fallow and Drill Culture.

Answer.—Rotation of crops, as the name implies, consists of bringing crops of different kinds to succeed each other in a certain order. The reason is that one kind of crop draws from the soil a greater amount of a particular substance or substances, than another crop. Wheat requires large quantities of potash, soda and phosphate of lime, while frequent and repeated cropping exhausts the soil. Hence other crops, such as roots, &c , should intervene, which draws more largely on other substances for support. On old, cleared farms the following course may be suited tomany situations and soils :—First year, wheat; second, turnips, or roots well manured; third, barley, or spring grain sown with grass seeds; fourth, hay; fifth pasture. A strict system of rotation cannot be carried out generally, in so new a country as Canada. We should study to prevent exhaustion by keeping land for two or more years in pasture and growing wheat at longer intervals. Fallows and drill crops keep the land clean, and expose the soil to the action of air, heat and moisture.

Question 16.—Explain the theory of Rent, and the circumstances which affect the value of land. What should be the principal conditions of a farm lease?

Answer.—Rent is the price paid for the use of land, and like the interest paid for the use of money, the amount depends on the value of the article loaned. Rent is the amount remaining after the labor and expense of cultivation, with the farmer's remuneration for skill and labor, are paid. The value of land is

regulated by the natural capabilities of the soil; its contiguity to markets and large population, and the facilities of obtaining extraneous manures, &c. In the long run, the true interests of the landlord and tenant are identical; a principle in practice too little regarded.

The principal conditions of the lease are :—Its duration—the longer terms are preferable—such as fourteen or twenty-one years, affording full time for the tenant to get back the profits of his improvements. 2nd. Covenants in relation to the mode of cropping, repairing buildings, manures, mode and time of payment of rent, &c. 3rd. Time of entering and leaving the farm, and the destination of the lease on the decease of the tenant. 4th. The usual reservation of the landlord's right of property, such as timber, minerals, &c., and security to the tenants of his rights and interest. Leases should be drawn by, or submitted to competent parties having a practical knowledge of the farming of the district.

Question 17.—What is the best system of husbandry for Canada, so as to obtain, in the long run, the maximum of profit, without deteriorating the soil?

Answer.—The system of farming best suited to Canada for general purposes is what is termed the mixed, that is the raising and feeding of live stock in connection with arable culture. These two objects mutually assist each other, and when judiciously balanced tend to sustain the productiveness of the soil.

Question 18.—Having a farm exhausted by over-cropping, which course would be most judicious, to incur the expense of renovating it, or to dispose of it and purchase with the funds new land in the west?

Answer.—Much depends on circumstances; but as a general thing adopt renovation, particularly if the soil is naturally productive and markets near and good. "Prefer the certain to the uncertain."

Question 19.—What means must generally be used for restoring exhausted land?

Answer.—1st. By a judicious rotation of crops. 2nd. Ploughing in green crops; as clover, buckwheat, &c. 3rd. By introducing plants that send down long fusiform roots into the soil and subsoil. 4th. By deeper ploughing, subsoiling and, where necessary, deep and efficient draining. 5th. By laying down to pasture. 6th. By restoring in the form of manure, those ingredients to the soil of which repeated cropping had deprived it.

Question 20.—What suggestions occur to you for advancing the practice and interests of Canadian agriculture, and for increasing the intelligence and raising the social standing of those engaged in it?

Answer.—By leaving manufactures and protection to take care of themselves, which every political economist knows they will. To facilitate the settling of new lands, which should be thrown open at the lowest cost to first settlers. By increasing the efficiency of Agricultural Societies, and the encouragement of all attempts to impart new and improved varieties of animals, seeds, roots, &c. By the diffusion of sound knowledge and education among the masses of the people,

—not the education which would make a farmer's son feel that to be respectable, useful, and to occupy an honorable social position, he must abandon his father's pursuit and become a lawyer or a physician, and that farmers are mere "hewers of wood and drawers of water." That it is more genteel, and honorable, and better suited to develope the powers of the whole man, to measure tape, than to cultivate soil, is a pernicious error that must be abandoned. Our young farmers especially must learn to respect highly their honorable and useful calling, when they will truly respect themselves.

In an agriculturial country like Canada, a liberal and persevering support of Colleges and Schools, in which the science and practice of this all-important art is taught and illustrated, of farmers' clubs, agricultural societies, the erection and diffusion of an agricultural literature, are the principal means of advancing agriculture, and of rasing our farming population to their natural position in the social scale, and of fitting them for the highest offices, which a free and enlightened people can bestow.

THE PROGRESS OF ENGLISH AGRICULTURE.

Continued from Page 191.

For several years past all the railway companies have agreed to convey live stock free, and implements at half their usual charges, to and from the shows of the Royal Agricultural Society, the railway company at the towns where they are held generally providing accommodation for the mechanical compartment. This at Chelmsford cost the Eastern Counties upwards of £3000. Railway fares and pace could alone bring the number of shilling-paying strangers who contribute to the enormous expense of these exhibitions. The population of the city of Salisbury, including men, women, and children, only amounts to 10,000 but the visitors to the show yard in 1857 were over 35,000. This is of itself a striking proof of the wide and eager practical interest which is felt in agriculture, for there is little to gratify the eye of mere holiday gazers; and when in addition we consider the mountains of coal, iron, timber, artificial manure, lime and chalk, conveyed in one direction, and the quantity of live stock and corn in the other, we cannot help coming to the conclusion that George Stevenson's locomotive has been the great cultivator of the farmer's mind and the farmer's land—the great agent for the extraordinary advance which British agriculture has achieved in the last quarter of a century. Very significant were the figures given by the chairman of the Eastern Counties Railway at the Chelmsford dinner, when he told his farmer friends that, in the course of the preceding twelve months, the lines over which he presided had conveyed 24,000 tons of guano and other portable manures, 700,000 quarters of grain, 550 sacks of flour, 71,000 beasts, 380,000 sheep, 13,000 tons of meat and poultry, and 43,000,000 quarts of milk. Who can calculate the value of the money rewards held out to breeding, feeding, and corn-growing, in the shape of four thousand miles of railway? and how little are men who live in the midst of these changes conscious of their magnitude until the results are collected and put upon paper!

The benefit which has accrued from the Royal Agricultural Society has surpassed the expectations of the most sanguine promoters. The improvements in cultivation and implements, which had been effected by a few men in advance

of the spirit of the age, have now, in great part by its exertions, ceased to be received by the majority of farmers with contemptuous incredulity, and by the labourers with stubborn opposition. In the old days distance operated as a barrier to imitation, and three-fourths of England only heard of what was done in the well-cultivated fourth to ridicule and despise it. When the father of Mr. George Turner, of Barton, Devon, the well-known breeder of Devon cattle and Leicester sheep, who had learned something in his visits with stock to Holkham, began to drill turnips, a well-to-do neighbour looked down from the dividing bank and said to his son, 'I suppose your father will be sowing pepper out of a cruet next.' Indeed the whole history of the turnip cultivation affords a characteristic contrast between the spirit of the past and the present. It took upwards of a century to establish the proper growth of this crop, notwithstanding that the wealth of meat and corn which proceeded from it was as plain to those who would open their eyes as that a guinea was worth one-and-twenty shillings. The first difficulty was to persuade farmers to try it at all; and not one turnip was ever seen on a field in Northumberland till between 1760 and 1770. The second difficulty was to get them to be at the expense of hoeing, insomuch that Young said that he should be heard with incredulity in most counties when he bore testimony to the vast benefits which were derived in Norfolk from this indispensible portion of the process. The third difficulty was to induce them to replace broadcast sowing by drilling, which appeared, as we see, to novices no less ridiculous than peppering the land from a cruet. The bigotry of the farmer cramped the energies of the mechanics whom he now welcomes as among his best friends. The implements, even by the first manufacturers, from the absence of criticism, and competition, from the limited extent of custom, and from the want of artisans skilled in working in iron, were, however excellent in idea, both clumsy and costly. The choicest specimens which existed in 1840 have been so altered in execution by cheaper materials and improved workmanship that they can scarcely be recognised.

The Royal Agricultural Society, with its council of peers, squires, tenants, and implement-makers—its professors of chemistry, botany, and veterinary art—its thousands of subscribers, spread over every county of England—its Journal of transactions and reports—and, above all, its annual encampments in the centres of successive districts—has done for farming what the great fairs of the middle ages did for commerce—concentrated and diffused knowledge, brought customers and producers into contact, and helped to extinguish prejudices in the excitement of social gatherings. They have carried to provincial cities the best live-stock, the best implements, and the best cultivators. The influence of example, of competition, and even of rank and fashion, has been brought to bear on local obstinacy. Squires have been encouraged to improve their estates by the speeches of even greater men than themselves, and young noblemen, in want of an object, have found it in agricultural duties. Implement-makers have had the advantage of the suggestions of their customers, and, thus taught and teaching at the same time, have every year become more dependent on tenant and less on fancy farmers. Men who went to Shows stanch champions of the flail have been vanquished by the mere sight of a steam-engine driving barn-machinery; as an old Homeric Greek, if he could revisit earth, would instantly recognise the inferiority of stones hurled by the hand to the iron balls projected from the cannon's mouth. The greatest landlords, wandering unknown in the show-yards, have had opportunities of learning wholesome truths from the tenants of other landlords. Self-satisfied ignorance is abashed, and triumphant skill finds at once a large and eager audience. These agricultural exhibitions are, in fact, the Woburn and Holkham sheep-shearings, made national and expanded to the dimensions of an age of steam-driven threshing-machines. When the Royal

Society started into life there were about four hundred local societies in existence, but they were rather associations for the promotion of eating and drinking than for the promotion of the arts by which the materials for eating and drinking are increased. The speeches were usually complimentary, and the members congratulated one another upon the pre-eminence to which their own enlightened district had attained. They were, in a word, societies for maintaining local darkness instead of for the acquisition of fresh light from enlarged experience.

Having described the important functions discharged by this central Society for the advancement of farming, we proceed to touch upon the particular improvements which have been effected during its career. Attempts to drain have been made from the earliest times. Specimens may be seen of very clever workmanship more than a hundred years old: but the when it should be done, and the why, and the how, had never been reduced to rule. Lord Bacon who had a large collection of works upon agriculture, had them one day piled up in the court-yard and set in fire, for, said he, "In all these books I find no *principles;* they can, therefore, be of no use to any man." This was just the deficiency with respect to drainage, and it could not therefore progress until Josiah Parkes, in 1843, expounded the "principles," and in 1845 made suggestions which led to the manufacture of the steel tools which were necessary for forming the deep cuttings, and the cheap pipes which were essential to carrying off the water from them when formed. Up to 1843 little was done beyond tapping springs, or endeavouring to convey away the rain which fell on the surface by drains so shallow that the plough frequently spoiled them, it being the popular belief that moisture would not penetrate through retentive clay beyond twenty or thirty inches. In 1833, when Mr. Parkes was engaged in draining a peat-bog near Bolton, in Lancashire, for Mr. Heathcote, he had an opportunity of seeing the great effect produced by deep cuttings, and he was led to ponder on the advantage that would be derived from relieving the soil of a certain number of inches of the water, which is stagnant during a rainy season and remains until removed by evaporation in a dry season. By experiments continued for several years, he found that a deep drain began to run after wet weather, not from the water above, but from the water rising from the subterranean accumulations below, and that, by drawing away the stagnant moisture from the three or four feet of earth next the surface, it was rendered more friable, easier to work, more penetrable by the rain, which then carried down air and manure, and much warmer and more suitable for the nourishment of the roots of the crops. He came to the conclusion that the shallow draining, advocated by Smith of Deanston, was a vital error, and that four feet, which left a sufficient layer of dry warm surface earth, after allowing for the rise of the moisture by capillary attraction above the water level of the drain, should be the minimum depth.

The first field drained on the four-feet plan was on a farm near Bolton, belonging to a celebrated Lancashire bone-setter. This was a small beginning of the subterranean net-work of pipes which has more than doubled the value of our retentive soils. In 1843 Mr. Parkes gave his evidence before the Agricultural Committee of the House of Lords, and was strongly supported by the Earl of Lonsdale, whose experience as a commissioner of highway trusts had proved to him the advantage of the system. But nothing could be done without tools and pipes. A Birmingham manufacturer, on Mr. Parkes' suggestion, produced in 1844 the set of drain-cutting implements which have by degrees been brought to perfection. A cheap conduit was still a difficulty. Stones choked up in many soils, and where they had to be broken and carted to the ground, often made the cost enormous. In 1843, at the Derby show of the Royal Agricultural Society, John Reade, a gardener by trade, a self-taught mechanic, well-known as the inventor of the stomach-pump, exhibited cylindrical clay-pipes, with which he had

been in the habit of draining the hotbeds of his master. Hie mode of constructing them was to wrap a lump of clay round a mandril, and rub it smooth with a piece of flannel. Mr. Parkes showed one of these pipes to Earl Spencer, saying, "My Lord, with this pipe I will drain all England." The Council, on his Lordship's motion, gave John Reade a silver medal for his idea, and in the year following offered a premium for a tile-making machine. A great deal of money was wasted in attempts, and many patents were taken out for the purpose with indifferent success; but in 1845, at Shrewsbury, Thomas Scragg received a prize for a machine which triumphed over the difficulties, and pipes can now be made quite as fast as kilns can take them.

The work from that hour went rapidly forward. In 1846 Sir Robert Peel, whose management of his own property had made him thoroughly alive to the national importance of the subject, passed the Act by which four millions sterling were appropriated toward assisting landowners with loans for draining their land, with leave to repay the advance by instalments extending over twenty-two years. Nearly the whole of the first loan was absorbed by canny Scotch proprietors before Englishmen had made up their minds to take advantage of it. But the four millions of Government-money was small in comparison with the sums furnished by private enterprise for the execution of an improvement which on the worst class of wet land gave visible proofs of its value by immediate profits. Another circumstance stimulated the work. About the period that the system of deep draining was perfected, the great landowners were anxious to encourage their tenants, depressed by the approaching free trade in corn, and thorough draining became the most fashionable improvement. The sheepfolding Norfolk rotation had done great things for light land, brought the cultivation of roots to a high pitch, and proportionately increased the live-stock on every light-land farm. The owners of strong retentive soils were anxious to imitate their light-lanp neighbours, and to grow the roots which were seen to afford such profits in beef and mutton. Deep drainage enabled them to realize these aspirations.

For centuries the farmers of clay soils had been engaged in trying various expedients for saving their corn crops in wet seasons. The land was laid up in "lands," "backs," or "steches," that the rain might flow off into intervening surface-drains, a few inches deep, and which were formed of turf, bushes, and stones. Not unfrequently an anxious farmer would traverse his cornfields after heavy rains, spud in hand, and try to lead the stagnant little pools to the neighbouring ditches. In favourable seasons the clay usually gave excellent crops of corn, but a wet season destroyed the husbandman's hopes. These stiff soils had been preferred, until light heath-land had been brought by sheepfolding, marling, and root-growing into profitable culture. The introduction of thorough drainage restored them to their ancient pre-eminence. Hundreds of thousands of acres, formerly condemned to remain poor pasture, or to grow at long intervals uncertain crops of corn and beans, have been laid dry, rendered friable, and brought into a regular rotation, in which roots find their place. Sheep-stock thrive where previously a few dairy cows starved; the produce has been trebled, the rental raised, and the demand for labour increased in proportion. In the neighbourhood of Yorkshire manufactories, moorland not worth a shilling an acre has been converted into dairy-farms worth two pounds. When it is remembered that the principle upon which these results depend was not enunciated till 1843, it will be seen how rapid and mighty has been the recent progress in agriculture. A second public loan of four millions was granted in 1856, and it has been estimated that in the ten previous years upwards of sixteen millions had been invested by the nation, and by private companies and individuals, in thorough drainage. There is no longer truth in the saying that the capital and soil of the country have never been acquainted. All the branches of farming business felt

the influence, for the improved stock originated by Bakewell, the artificial food raised to feed the improved stock, the scientifically constructed drills, horse-hoes, and other implements which the Norfolk rotation called into use, all met with an extended development in the retentive soils rendered kindly by the use of "Parkes' clay pipes." It will usually be found that an advance in one direction gives a corresponding impulse in every other.

The Royal Agricultural Society had an important share in the propagation of the principles of thorough drainage first propounded by their author in a complete shape in a lecture at one of their meetings at Newcastle. Another great change, by a fortunate coincidence, accompanied, or rather preceded, the conquest over the clay lands. This was the chemical revolution, which gave the farmer the use of concentrated portable manures, for stimulating the growth of crops in a degree unknown to the preceding generation. Previous to 1835, as nearly as we can fix the date, agriculturists, in addition to farm-yard dung or night-soil, employed as manures lime, chalk, gypsum, marl, soot, salt, saltpetre, rapecake, and bones. The discovery of the fertilizing properties of bone was accidently made at a Yorkshire foxhound kennel. Liberally used on the heaths and wolds of Lincolnshire, it was the philosopher's stone which turned rabbit-warrens and gorse fox-coverts into fields of golden grain. A Mr. Nelson, one of the late Lord Yarborough's tenants, used to say, that "he did not care who knew that he had made £80,000 out of his farm by employing bones before other people knew the use of them." But what succeeded in one parish or even in one field often failed in the next, and sometimes the farm which had once yielded bountifully in return for a dressing of lime or gypsum stubbornly refused to respond to a second application. Worse than all, the root crop—the foundation of the famous Norfolk rotation, the wealth of half a dozen counties—began to fail, devoured in tender infancy by the fly; and, without the turnip, where was the food for sheep and winter-fed cattle? The philosopher came to the assistance of the farmer, and rescued him by timely aid from the difficulties which beset him. Nitrate of soda and guano were imported, superphosphate of lime from bones was invented; and agricultural chemistry, having earned the place of a practical, that is, a profitable science, the anomalies in connexion with the use of lime, chalk, gypsum, &c., were mastered and explained by the joint exertions of the farmer and his new ally the chemist.

Nitrate of soda was imported from Peru and sold in small quantities by an agricultural manure-dealer somewhere about 1835, and in the same year a cargo of guano was consigned to a Mr. Myers, a Liverpool merchant. Guano (of any agricultural value) is the dung of sea-fowl feeding on fish in a zone where rain rarely falls. The guano of the Peruvian islands was protected in the time of the Incas by special laws. In 1609, its properties were fully described in a work published in Lisbon by Garsilaso de la Vega, but this precious fertilizer was neglected in Europe until the date of Mr. Myers' importation, when investigations into the chemistry of agriculture, commenced by Sir Humphrey Davy with very little practical effect during his lifetime, and carried on by continental philosophers, were beginning to bear fruit. Guano, although incredulously received by farmers in 1836, was eagerly accepted by the dealers in artificial manures, and sold, either in a pure state or under a special name, mixed with less active ingredients. In 1843, a store inferior to that of Peru having been discovered on the Ichaboe Islands, on the coast of Africa, 1100 feet long, 400 broad, and on average 35 feet deep, the whole was removed before the close of 1844, and realized upwards of a million sterling. Three years previously, an article of forty-three pages, from the German of Dr. Charles Sprengel, appeared in the first volume of the "Journal of the Royal Agricultural Society," in which, though every kind of animal manure was described, guano only received a

passing mention as a curiosity, and no note to supply the deficiency was attached by the editor; so little was it then known to the most intelligent cultivators, and so speedily had the knowledge of its value spread in the interval. This single fact would alone show that we had reached a new era in the history of farming.

In 1840, before the farming public had become accustomed to these imported manures, Professor Liebig suggested that the fertilizing power of bone manure would be increased by the application of sulphuric acid, and the consequent production of superphosphate of lime. There have been periods in our history when a book like that of Liebig would never have travelled further than the libraries of our men of science; but in 1840 we had in our dealers in manures a commercial class keenly alive to the possible profits of a philosophical suggestion. A carboy of sulphuric acid was easily poured over a few bushels of ground bones, and soon Suffolk drills, charged with superphosphate and guano, were sent to teach farmers that if they wished to grow great root-crops there was something to be added to the invaluable "muck."

One of the first to experiment upon the new manure, and then to manufacture it on a large scale, was Mr. J. B. Lawes, a Hertfordshire squire and scientific chemist. He was followed by Mr. Purser, of London, who began, in 1843, with a single carboy of sulphuric acid, price 10s., and has since frequently purchased ten thousand carboys at one time. At Southampton, a few years later, Messrs. Dixon and Cardus made an excellent speculation by a contract with the Government of Buenos Ayres for the exclusive right of exporting the charred flesh and ashes of joints of meat burned for want of other fuel on the treeless Pampas, to boil down the tallow. This animal refuse, the accumulation of a quarter of a century, when treated with sulphuric acid, is converted into valuable superphosphate. But although every quarter of the globe, even battlefields, were ransacked for bones, the supply was insufficient, and some new resource was required in order to keep down the price.

The chemists having so far done their part, the next contribution to the progress of agriculture came from the geologists. Professor Henslow, whose great acquirements as a botanist had not prevented his attending to other branches of science, had noticed in 1842 some nodules at Felix Stowe, on the coast of Suffolk. In 1843, haunted with the idea that they were something of importance, he returned to Felix Stowe, collected a quantity of them, and placed them in the hands of a Mr. Potter for analysis. The analysis showed them to be fossils, commonly called coprolites, on the supposition that they consisted of animal excrement, and containing from 50 to 55 per cent. of phosphate of lime. From this discovery Professor Henslow might have realized a considerable fortune. The quarry of coprolites was to be had at a common rent, and there were manure manufacturers prepared to pay for the information, but he "did not consider such a course consistent with his position as a man of science and a clergyman," and after keeping silence on the subject for some months at the request of Mr. Potter, "who wished to have the chance of availing himself of the discovery," he gave the results of his investigation to Mr. J. B. Lawes, who made the superphosphate obtained from coprolites the subject of a patent, which he was not able to maintain. Subsequently, beds of coprolites were discovered in Cambridgeshire, Hampshire, and Dorsetshire, and further investigations in Norway placed Mr. Lawes in the exclusive possession of great beds of another fossil called *apatite*, rich in phosphates—of which he imports whole cargoes for his manufactory at Bow, near London. The superphosphate of lime, however, produced from fossils being much less soluble than that from fresh bones, can only be usually applied when mixed in moderate proportions with the latter.

One other important addition to the portable manures was discovered about seven years ago by Mr. Odams in the blood and garbage of the London slaughter-

houses, which, formerly thrown down sewers and upon dung-heaps, is now contracted for to the extent of nearly eight hundred thousand gallons a-year. Mixed with ground or calcined bones and sulphuric acid, it is converted into a powerful corn and root fertilizer, known to agriculturists as the "Nitro-phosphate manure." The mere fact that these products were articles of sale, and not of home manufacture by the farmer, had a powerful influence in extending their use. Those on whom the essays of Professors and the orations of landlords produced little effect were worried into inquiry by the agents of manure-vendors, and, as the new practice spread, were convinced almost against their will by great crops in the fields of enterprising neighbours. The vendor of artificial manures helped in another particular the general movement. He soon discovered that his fertilizing stimulants were robbed of half their value on wet or ill-cultivated land. Hence he became the eager advocate of thorough drainage, and that thorough preparation of the soil which can only be effected by the best class of ploughs, harrows, horse-hoes, and clod-crushers. His customers would have been customers no longer unless he could have convinced them that the fault was in themselves and not in the goods. He argued to ears which had at last been opened, and prevailed without the assistance of the hedge-stake. A man grudged growing weeds with the fertility for which he had paid in hard cash, nor could a manure that cost £10 or £12 a ton be refused the economy of a machine to distribute it carefully; and thus drill husbandry, which is identified with clean husbandry, spread, led by pipe-drains, from Norfolk, Suffolk, and Bedfordshire, into every county of England, and with it bought all the machines and implements required for "clean, rapid, concentrated cultivation."

It was between 1816 and 1836,—the twenty years in which the breaking up of poor pastures and the reclamation of waste lands were most vigorously carried on by means of turnip-drilling, sheep-folding, and the four-course rotation—that the crude forms of the greater number of the agricultural implements which are now considered 'standard' were either invented or brought into use among the great lightland farmers. In general the ingenuity of the mechanic outstripped the wants of the cultivator, and many excellent contrivances had been forgotten because they were in advance of the requirements of the day. Under the new demand for mechanical aids, more than one ingenious blacksmith or wheelwright rose from a humble position, and has since expanded his small forge into a factory where steam-power and the best artisans are employed in the construction of agricultural implements. The opposition raised to the introduction of some of these machines, under the idea that they were injurious to the labourer, is known to every one. Between 1836 and the present time this prejudice has been almost entirely extinguished by a series of legislative and national changes. The commutation of tithes has unlocked the land; the new poor-law has, to a certain extent, emancipated labour, although the law of settlement still weighs heavily upon the improving farmer and the enterprising peasant; the Irish famine, and the enormous emigration during the last ten years to America and Australia, have removed a mass of floating, half-employed workmen, and made way for the introduction of the threshing-machine, the drill, the haymaking-machine, and the steam-engine, without producing a murmur of discontent. Experience, moreover, has convinced most persons that the use of agricultural machinery creates an increased demand for constant labour of a superior kind, although undoubtedly it relieves the farmer from his dependence on an itinerant army of reapers and haymakers. The true effect of the iron workman is not to displace the human, but to perfect cultivation, to multiply produce, to increase the means of subsistence, and to add to the prosperity of the entire community.

It may be taken for an axiom, that when a farmer has used even one good implement he derives so much advantage from its rapid and accurate work, that

he returns again and again to the manufacturer's yard until he has, as far as possible, substituted horse for human power, and steam for horse-power. The flail, so long kept going by the pauper-creating Poor Law, could not have threshed out the breadth of corn which is now grown with the aid of stimulating manures. The picture which is given in Lisle's 'Husbandry,' written in 1714, remained often true up to our own time, because, though there might be a difference arising from the greater or less quantity of grain in the ear, according to the season and the tillage, neither the flail nor the man who worked it varied from the flails and men of bygone generations. 'A good thresher,' he says, 'assured me that five or six bushels of wheat was a very good day's threshing, and, in case the corn was clung and yielded ill, sometimes three bushels was as much as could be threshed in a day.' In another place he tells us that 'iron-clouted shoes do not well to thresh wheat in, especially if it be new corn: a thresher's shoes should, by right, be soled with an old hat.' Horses, always the more fatal expense of a farm, were wanted for other purposes as cultivation expanded: and it was found in addition that it did not pay to wear out good animals in the circular drag of a threshing-machine. Thus a way was made for the steam-engine. So early as 1802, General Bulwer, the father of the novelist, erected, at his seat at Hydon in Norfolk, what Young believes to have been the first which was used in England for agricultural purposes. The cost of it was £600, and it was to thresh, dress and grind the corn, and cut chaff and hay. The earliest experimenters usually pay, and their successors profit. As the practice was not followed, it is probable it did not answer. The rapidity with which it has spread in the last few years adds another to the particular characteristics of the agriculture of our time. The travelling steam-engine, constructed to be drawn by horses from barn to barn and parish to parish, first made its appearance in an unsuccessful shape at Liverpool in 1841, was formed into a working machine by Mr. Cambridge of Bristol in 1842, grew at once into favour, and in 1845 had become fully established. A new trade sprung up almost like mushrooms in a night, and the show at the Royal Agricultural Society at Salisbury in 1857 was attended by upwards of twenty manufacturers, from almost every district of England. One firm alone made upwards of five hundred engines of an average power of seven horses, in the twelvemonth ending December, 1856.

The threshing-machine which the steam-engine worked has advanced in an equal degree. It was originally a mere box for roughly beating out the corn from the straw, and beating the corn almost as much as the straw. Step by step it was improved, until at Lewes, in 1852, a machine was exhibited which winnowed as well as threshed the corn and delivered it ready for dredging. Since that date 'barn machinery' has been produced which 'threshes, raises the straw to the loft, winnows and dresses the corn, divides the wheat according to quality, and delivers it into sacks ready for market, while the tailings, also divided into first and seconds, remain for the pigs and poultry, and the cavings for litter in the boxes or pigsties.' These multiplied services it performs at the rate of 800 bushels a day and at a cost of 2s. 6d. a quarter. The same engine which puts in motion all this automaton work is often made available for pumping water, grinding corn, crushing cake, cutting chaff for cattle, and grinding bones for manure, while the steam from the boiler may be turned into an apparatus for cooking food for cattle.

The reaping machine lay dormant in this country after it had been devised by the Rev. Patrick Bell, because it was not called for by the state of the labour-market, and was re-invented in two different forms in the United States, because the scarcity of manual labour there made it indispensable. It was brought into notice at the Great Exhibition of 1851, and answers the double object of relieving

the farmer from his dependence on itinerant labour, and of economizing that most valuable element, *time*, in garnering the harvest. It took more than fifty years to make the seed-drill a standard implement; within six years the far less valuable and less perfect reaping machine has grown into extensive use. One more gap remained to be filled up at the date of the Salisbury Meeting, in order to complete the mechanical requirements of a well-ordered farm, so that the stubble of the land, where the corn is sown by drill, reaped by horse-power, threshed out by steam, and sent in the shortest possible time by railway to market, should be at once broken up by the resistless force of a Steam Cultivator, instead of being left for the net-like twitch to spread and weeds to seed until the following spring. We almost believe, yet we dare not assert, that this crowning triumph of agricultural engineering has now been achieved. The retentive clays fertilized ten years back by deep drainage will then be brought to develope their full power of production by a gain of time often equal to a whole season.

But perhaps nothing illustrates better the change which has come over farming in the last few years than what has taken place with respect to so ancient and familiar an article of husbandry as the plough. Although an implement more than two thousand years old, it is only within the last sixteen years that it has been reduced to an uniform shape and material. In engravings, to the eye of the casual observer there is now no difference between the ploughs manufactured for the same purpose by every one of the eminent makers; and, in fact, in general construction, they are all alike, except where the "turnwrests of Kent and Sussex" are used, although some have a marked superiority in the details and in durability. They are fashioned entirely of iron and steel, of long graceful wave-like form, provided with a pair of wheels of unequal size, and drawn by a chain attached to the body of the plough. Iron screws and levers have replaced wooden wedges. A few seconds are sufficient to attach the share or adjust the coulter. It was quite otherwise in 1840. Out of six ploughs engraved in the Journal of Agriculture for that year, two are swing, two have two wheels, two have one wheel each, all are of wood, except the shares and breasts, all are drawn from the extremity of the beam, and the awkwark inferiority of their respective shapes is perceptible at a glance. In 1840, Lincoln, Rutland, Bedfordshire, Berks, and almost every other county, had its separate plough, and knew little of its form in the rest of the kingdom; the exceptions being among the customers of scientific makers, whose trade was restrained by the cost of conveyance, the want of publicity, and the want of intelligence. Mr. Pusey and Mr. Handley, who contributed articles on the Plough to the first volume of the Royal Agricultural Society's Journal, were, as gentlemen farmers, far ahead of their time, but it is evident, from their observations, that they had everything to learn in the science and practice of agricultural mechanics. Mr. Handley's acuteness led him to conclude that wheel ploughs were of lighter draught, "contrary to the opinions of the writers" whom he had consulted; but Mr. Pusey, in his general report on English agriculture, evidently prefers the Scotch swing plough, not aware that the old Bedford wheel plough, even in its unimproved state, was a better implement. After mentioning the instances in which the Scotch plough failed, he hesitatingly adds, "It is even doubted whether one wheel might not be advantageously restored." Another report on a trial of different kinds of ploughs in Berkshire showed how general was the ignorance of the simplest principles of mechanical knowledge, for he confesses that he had no idea that there would be any "difference of draught between a smooth share and one covered with tar or paint." These trials, valueless in themselves, were the commencement of investigations by well-informed persons under the auspices of Mr. Pusey, and of a series of public competitions, which have placed ploughs constructed on the best princi-

ples, and in the best manner, within the reach of every parish in England.—The improvement is as great as the change from the old musket to the Minie rifle. Skilful manufacturers, each eager to command the market, study, with all the aids of a mechanical knowledge and a wide experience, to secure excellence of design, durability of make, and economy of price, while the farmer in his turn has learnt that science is a better constructor than ignorance, and no longer prefers the chimney efforts of a village artizan. The marvel is in the rapidity with which these changes have been effected, as if some magician of agriculture had waved his hand over our favored island.

To be Continued.

MISCELLANEOUS.

Use of Lime in Agriculture.—The action of lime is two-fold; first, physical, and second, chemical. As a mechanical agent it opens stiff clays, rendering them friable, mellow, and more easily worked; chemically, it acts upon the vegetable matter of the soil, and sets free those stores of valuable substances which, without the action of this agent, must have remained inert and useless. It also enters directly into the composition of plants, and in many varieties forms a large proportion of the weight of their inorganic constituents. It neutralizes certain acids which are often present in soils, rendering them useful to vegetation, instead of being positively injurious, which they are in their original state. The existence of water in the soil, however, affects the action of lime very considerably. If the land is wet and undrained, lime will not exert the same influence which it would do in the case of thorough drained land. A greater quantity of lime is necessary to produce a given effect, and thus the neglect of thorough drainage entails a considerable greater expenditure in liming than would have been necessary, if the land was either naturally or artificially dry.—*Cameron's Chemistry of Agriculture.*

Changes in the Atmosphere.—Dr. Lindley Kemp, in his "Natural History of Creation," makes the following remarks on this subject:—"At a very early period the atmosphere was charged with carbonic acid, the carbon of which now forms parts of animal and vegetable substances. At first it contained no ammonia, but since vegetation and decomposition began, the nitrogen that existed in the nitrates of the earth, and some of the nitrogen of the atmosphere have been gradually entering into new combinations, and forming ammonia, a substance at first non-existent, but gradually increasing, and, as it is volatile, the atmosphere *now always contains some of it.* The quantity has lately become so great that it can always be detected by chemical analysis, and there is an evident tendency to increase in the atmosphere. Now suppose it to go on increasing to a certain point; it forms with air, a mixture which is violently explosive; an atmosphere charged with ammonia, is liable to explode whenever a flash of lightning passes through it, and such an explosion would doubtless destroy, perhaps without leaving traces of, the present order of things."

Wonderful Mechanism in the eyes of Birds.—A singular provision is made for keeping the surface of the bird's eye clean—for wiping the glass of the instrument as it were, and also for protecting it, while rapidly flying through the air and through thickets, without hindering the sight. Birds are for these purposes furnished with a third eyelid, a fine membrane or skin, which is constantly moved very rapidly over the eyeball, by two muscles placed in the back of the eyes. One of the muscles ends in a loop, the other in a string which goes

through the loop, and is fixed in the corner of the membrane, to pull it backward and forward. If you wish to draw a thing towards any place with the least force, you must pull directly in the line between the thing and the place; but if you wish to draw it as quickly as possible, and with the most convenience, and do not regard the loss of force, you must pull it obliquely, by drawing it in two directions at once. Tie a string to a stone, and draw it towards you with one hand; then make a loop on another string, and running the first through it draw one string in one hand, not towards you, but sideways, till both strings are stretched in a straight line; you will see how much more easily the stone moves quickly than it did before, when pulled straight forward.—*Brougham's Miscellanies.*

Adulteration of Flour.—It is well known that the flour of various kinds of grain is often adulterated with alum, plaster, and even arsenic, when a crime is contemplated. These frauds can always be discovered, but only by means of complicated operations. A chemist, of Charleville, M. Cailletet, has just discovered a method by which even the ten-thousandth part of any mineral substance may be detected in a few instants. Chloroform, that singular compound which has already rendered so many services to science, is again the chief agent here. Flour is insoluble in this substance, and much lighter, whereas all mineral substances are heavier; were water or any other liquid used instead of chloroform, the flour would either form into a paste or be decomposed. These facts being kept in mind, M. Cailletet's method will be easily intelligible. A small quantity of the flour to be tested is introduced into a glass tube closed at one end, about an inch in diameter by eight or ten in length. Chloroform is then poured into the tube, which, after being well corked and shaken, is left to stand for some time in a vertical position. The flour will soon rise to the surface, while all the mineral substances it contained fall to the bottom; the liquid may then be decanted, and the deposit subjected, if required, to a chemical analysis.

African Desert Plants: Adaptation of Structure to Purpose.—The quantity of grass which grows on this remarkable region is astonishing, even to those who are familiar with India. It usually rises in tufts with bare spaces between, or the intervals are occupied by creeping plants, which, having their roots buried far beneath the soil, feel little the effects of the scorching sun. The number of these which have tuberous roots is very great; and their structure is intended to supply nutriment and moisture when during the long droughts they can be obtained nowhere else. Here we have an example of a plant, not generally tuber-bearing, becoming so under circumstances where that appendage is necessary to act as a reservoir for preserving its life; and the same thing occurs in Angola to a species of grape-bearing vine, which is so furnished for the same purpose. The plant to which I at present refer is one of the Cucurbitaceæ, which bears a small scarlet-coloured eatable cucumber. Another plant named Leroshua is a blessing to the inhabitants of the Desert. We see a small plant with linear leaves, and a stalk not thicker than a crow's quill; on digging down a foot or 18 inches beneath, we come to a tuber, often as large as the head of a young child; when the rind is removed, we find it to be a mass of cellular tissue, filled with a fluid much like that in a young turnip. Owing to the depth beneath the soil at which it is found, it is generally deliciously cool and refreshing. Another kind, named Mokuri, is seen in other parts of the country, where long-continued heat parches the soil. This plant is a herbaceous creeper, and deposits underground a number of tubers, some as large as a man's head, at spots in a circle a yard or more horizontally from the stem. The natives strike the ground on the circumference of the circle with stones, till, by hearing a difference of sound, they know the water-bearing tuber to be beneath. They then dig down a foot or so and find it.—*Livingston's Missionary Travels.*

Continued from Page 188.

THE DISEASES OF SWINE

Are not very numerous.—*Colic* is not very common. The symptoms are those of sudden and extreme pain; and the remedy a dose of tincture of opium and spirit of nitrous ether, from one drachm to eight of the former, and double this quantity of the latter (according to the size of the animal), with a few ounces of warm water. Bleeding may also be adopted if relief is not at once afforded by the medicine.

Inflammation of the Bowels is more frequent. There is great fever and loss of appetite. The treatment should consist of copious bleeding, in the first instance—the most convenient place for the operation being the vein on the inside of the fore-arm. From two ounces up to two pounds may be taken, according to the size of the pig. If the vein inside of the arm cannot be opened, the tail may be cut, but it is quite useless merely to take away a few drops of blood. The bowels should also be relaxed by oily purgatives, such as linseed oil; and if costiveness exists, injections should be thrown up; in addition to this, warm baths will be found exceedingly useful, and for small pigs very convenient. In sub-acute inflammation, calomel and opium combined will be found a very excellent medicine, the dose being from two grains to five of each.

In constipation of the bowels, without active inflammation, there are various medicines that are very suitable. Jalap, in doses of from one scruple to a drachm, with six to twelve grains of scammony, will be found useful. Epsom salts, Glauber salts, and infusion of senna, are all desirable medicines, requiring, however, to be given in the form of a drench. Linseed oil is a useful purgative, and which the animal will often take voluntarily, and its activity may be increased by a few drops of croton oil, in cases of obstinate constipation.

Diarrhœa is not very uncommon in the pig. The following medicine will be suitable:—

Powdered opium	15 grains.
Prepared chalk	4 drachms.
Powdered ginger	1 drachm.
Peppermint water	4 ounces.

This will be sufficient for eight or ten doses, one of which may be given twice a-day whilst the symptoms continue. If the fæces are slimy, a dose of salts should also be given.

Protrusion of the Rectum.—This disease, as it may be called, is rather frequent with young pigs. The animal should be kept clean and quiet, and all food denied, with the exception of a ilttle milk, so that the bowels may be tolerably empty before the gut is returned. The pig being carefully secured, the parts should be washed, and the rectum carefully returned, and pushed up some little distance. Some strong thread, doubled several times, should then be passed through the anus, and tied with a knot, and no solid should be given for some days, the animal being kept mostly on milk.

Inflammation of the Chest and the Lungs is by no means an uncommon disease in the pig, attended with quick breathing, fever, and diminished appetite. In addition to blood-letting, the bowels should be moderately opened (not purged), and the following medicine administered once a-day:—

Calomel	1 to 3 grains.
Tartarized antimony	1 to 3 "
Nitre	5 to 20 "

After one or two doses the calomel may be omitted. When the disease is well defined, and the animal valuable, blisters may be applied to the chest.

Catarrh, or Cold.—A cough and discharge from the nostrils are the principal symptoms, and, with care and housing, the animal will often soon get well. In severe cases, it is well to give medicine, such as the following:—

Antimonial powder	2 to 6 grains.
Nitre	10 to 30 "
Digitalis	1 to 2 "

To be given daily for several days. Sometimes this disease extends to the lungs, and

becomes *bronchitis*, which is attended with danger. In addition to the above treatment, the animal should then be bled, and a stimulant rubbed on the brisket.

The *Epidemic*, as it is called in other animals, attacks pigs also, and proves sometimes very troublesome. The principal local symptoms are lameness in the feet, from soreness between the claws, and inflammation of the substance connecting the bone with the horn, so much so that pus often forms, and the hoof is cast. There is much fever in the system. The treatment should consist in the administration of a dose of Epsom salts internally, and the application to the feet of some astringent, such as a saturated solution of sulphate of copper or zinc, or the preparation advised for foot-rot in sheep.

Diseases of the Skin.—Pigs are rather liable to *eruptive diseases of the skin*, induced frequently by a high state of living. A cooling lotion, such as—

Muriate of ammonia.....4 drachms.
Acetic acid.....1 ounce.
Cold water.....1 pint,

will make a convenient topical application.

Measles.—Its seat is somewhat beneath the skin, on which we find a number of small, watery pustules externally, of a reddish color, and there is fever, cough, discharge from the nostrils, and pustules under the tongue. It is rarely fatal, but yields to cooling treatment, such as Epsom salts and nitre, with attention to feeding.

FRUIT TREES—APPLES.

The apple is, in point of usefulness, by far the most important fruit cultivated in Canada—constituting as it does a portion of the food of the country, both for man and beast—and a more extended cultivation, with the introduction of better sorts, would greatly increase its usefulness. Its costs no more either in space or labor, to cultivate a good kind of apple than a poor one, and many of the good sorts grow faster and are more productive than the common seedlings; whilst the difference of cost at the time of planting is not worth mentioning.

The first apple in point of excellence in Canada is the Fameuse or Pomme de Neige. Whether this variety was brought from France by the early settlers of Lower Canada or raised here, we do not know; but it has long been the favorite apple of this region. The tree is remarkably thrifty and hardy, and with the good treatment which all apples require, will produce every second year a full crop of beautiful, round, deep red fruit, with a snow white flesh, of the most delicious taste. This fruit can, be kept in good order in a cold, but not freezing apartment, till February or March, although its season is usually understood to terminate in January. It has been thought that the Fameuse will not grow to advantage except on the slopes of the Montreal mountain, but this is a mistake. We have eaten as good Fameuse apples, grown in the old orchards on the Detroit River, as in Montreal.

The Pomme Grise is usually ranked next in importance to the Fameuse, and is likewise a free-going, hardy tree; but the fruit, although excellent and long-keeping, is small and thinly set on the tree. The same space and labor would produce ordinarily four or five barrels of Fameuses to one of Pomme Grises.

The St. Lawrence, which originated, we believe, in this vicinity, may be ranked next in importance. It is a free grower and a great bearer. The fruit is very large, handsome, and good. It ripens nearly a month earlier than the Fameuse, and does not keep beyond Christmas. In fact, the fully ripe fruit is so soft and juicy that it will not keep well over a month or six weeks.

The Bourassa is an esteemed old variety, with a fine reddish-grey color, and a dry, sweet, aromatic taste; but the tree is so slow-growing and liable to premature decay, that it is seldom planted.

The above are all the varieties which may, strictly speaking, be called Lower Canadian. Of apples imported from Britain and the United States we have tried the following:—

The Early Harvest. This is the earliest apple grown here. It matures in the month of August, when its pleasant acid taste is more grateful than a sweeter flavor would be.

It is a free-grower, but, so far, rather a shy bearer. The fruit is green, and of a good size.

The Red Astrachan, which is the next earliest kind, is a remarkably handsome, rapidly growiug tree, and produces a splendid large scarlet apple; but the flavor is very poor, and so far as our experience goes, the crop is very small. We have, however, no trees over twelve or fifteen years old, and most sorts produce much more abundantly after that age.

The Ribston Pippin is an immense bearer, and the fruit is handsome and of pretty good quality. It is an early autumn apple in this region, and does not keep well.

The Keswick Codlin is also an immense bearer, producing a green apple suitable for cooking purposes.

The American Summer Pearmain is an early Autumn apple of a handsome mottled appearance, moderate size, and very excellent flavor. In this latter respect we think it next to the Fameuse, and it will keep about as long. The tree which is a free grower is, however, so far as we have seen yet, a shy bearer.

William's Favorite. This is a long scarlet fruit of great beauty, which ripens early in September. A tree about ten years old, which has latterly grown with remarkable rapidity, has come into bearing this year for the first time, and gives promise of being one of the most useful orchard varieties. The flavor is pretty good, the flesh reddish and somewhat dry, and we think it would keep two or three months. The American books speak very high of this variety.

The foregoing are all the sorts of any importance that we have tested, except two good kinds which we suppose to have been seedlings, and of which there are probably no other trees in exisience. One of these—an old tree which we have called the Canada Reinette—bears abundantly, a handsome, rather small, sweet, dry, and good keeping fruit, and the other, which we have called the Acid Apple, bears the greatest abundance of fruit we ever saw, which, however, requires an extra allowance of sugar in cooking.

Our experience respecting planting apples or pears does not confirm the general opinion that young trees from the United States or Canada do not thrive so well as those raised here. We have been, and know others who have been, alike unsuccessful with all. The great point is to have the trees in good order when they are planted, with roots neither dried nor frozen; and there is more danger of drying the roots in transporting trees carelessly for a mile or two, than in a journey of several hundred miles, if they are properly packed at the nursery.

The prejudice against trees from a distance is mainly owing to the dried condition in which they are delivered by tree pediars, or to the exposure which they suffer at auction, when sold in that way.

Trees may be transplated here from 15th October to the setting in of the frost, and from the drying of the ground in spring to the 15th, or even in some years, the 20th of May.—*Montreal Witness.*

A PICTURE FOR THE FARMER.

In the August number of the *Atlantic* is an article on "Farming Life in New Eng land," which exposes the errors and defects of the system of agriculture in the Northern States, and portrays the effects of the wasteful, "shiftless," and unskilful management exhibited in the first, greatest and best department of human industry, The following picture of a farmer's home will be recognized as a truthful portraiture of many—perhaps the majority—of farm houses even in this "Garden of the New World:—"

"A square, brown house; a chimney coming out of the middle of a roof; not a tree nearer than the orchard, not a flower at the door. At one end projects a kitchen; from the kitchen projects a wood shed and waggon cover, occupied at night by hens; beyond the wood shed a hog pen, fragrant and musical. Proceeding on further in this direction, we look directly across the road, to where the barn stands, like the hull of a great black ship-of-the-line, with its port-holes opened threateningly upon the fort opposite, out of one of which a horse has thrust its head for the possible purpose of examining the strength of the works. An old ox-sled is turned up against the wall close by, where it will have the privilege of rotting. This whole establishment was contrived with a single eye to utility. The barn was built in such a manner that its deposits

might be convenient to the road which divides the farm, while the sty was made an attachment of the house for the convenience in feeding its occupants.

"We enter the house at the back door, and find the family at dinner in the kitchen. A kettle of soap-grease is stewing upon the stove, and the fumes of this, mingled with those that generated by boiling the cabbage which we see upon the table, and by perspiring men in their shirt-sleeves, and by boots that have forgotten or do not care where they have been, make the air anything but agreeable to those who are not accustomed to it. This is the place where the family live. They cook everything here for themselves and their hogs. They eat every meal here. They sit here every evening, and here they receive their friends. The women in this kitchen toil incessantly, from the time they rise in the morning until they go to bed at night."

Contrast this with what might be the condition of the "Farmer's Home," and there will be found a great gulf between.

THE INTERIOR OF NORTH AMERICA.

Prof. Henry, of the Smithsonian Institution, has collected facts respecting the interior of the United States, which will command the attention of scientific men and statesmen. The induction from these facts is, that the entire region of the United States west of the 98th degree west longitude, (say the western boundary of Minnesota,) with the exception of a small portion of Western Texas and the narrow border along the Pacific, (including California) is a sterile waste of comparatively little value, and which can never be available to the agriculturist. The importance of this statement will be more fully comprehended when it is considered that the line of Prof. Henry, which extends southward from Lake Winnipeg to the Mexican Gulf will divide the surface of the United States into nearly two equal parts.

The intense heat and extreme dryness of this region, which will make the Great American Plains a barren waste forever, is caused to a large extent according to Prof. Henry's theory, by the fact that the returning Trade Winds, sweeping over the elevated masses of the Rocky Mountains, are deprived of their moisture; in other words, the heated air which ascends at the equator, saturated with moisture it has extracted in its passage over the ocean, after depositing a portion of its vapor in the tropics at the rainy season, it is further dessicated by the ridges and mountains which it meets, the vapor being condensed on the windward side by the cold due to the increased vertical height, and it finally passes over and strikes the plains as dry as a sponge which has been thoroughly squeezed. Without moisture there can be no fertility, no agriculture; and a great portion of this wilderness, according to Prof. Henry, is as irredeemably barren, for the purposes of agriculture, as the deserts of Africa. If this theory be true it will greatly modify the opinions which have been entertained by politicians and statesmen of the future destiny of the "Great West." Prof. Henry stated these facts to us a few days since, which we confess, greatly modified our ideas of the vast extent of Territory which we had always supposed was yet to be filled with human habitations like the already productive prairie states bordering the Mississippi.

No Man Can Borrow Himself out of Debt.—If you wish for relief you must work for it, economise for it. You must make more and spend less than you did while you were running in debt. You must wear homespun instead of broad-cloth, drink water instead of champagne, and rise at four instead of seven. Industry, frugality and economy —these are the handmaids of wealth, and the sure sources of relief. A dollar earned is worth ten borrowed, and a dollar saved is better than forty times its amount in useless gewgaws. Try our scheme and see if it is not worth a thousand banks and valuation laws.—*Philadelphia Argus.*

Cost of Underdraining.—On "the Premium farm of the Empire State," there are sixty-one miles of underdrains, all laid by the present proprietor, R. J. Swan, of Rose Hill, near Geneva. The cost has been much less than usual, as drains from two and a half to three feet deep have been laid complete at an expense of 28⅓ cents per rod. Digging, 12½ cents; laying the tiles and filling the drains with plows, 3 cents; average cost of tiles and cartage, 13 cents. The tiles alone frequently cost 25 cents per rod, freight included.

How to Increase the Value of a Cow.—Every one who owns a cow can see at a glance that it would be profitable to increase the value of her, but every one can't tell how to do it. We can, and we think that we can make it equally palpable to our readers. If a cow is kept for butter, it certainly would add to her value if the butter-making properties of her milk should be improved. In summer or winter this can be improved just as the yield of a cultivated crop can be improved by what is fed to each, and it is simply a question of will it pay, in manuring the one or feeding the other. Indian corn will add to the quantity and quality of the butter to a very sensible degree, and it is simply a question of easy solution, by experiment, whether it will add to the profit of the butter maker to buy corn at 1 or 2 cents a pound, and convert a portion of it into butter at 25 cents a pound, or whatever the market price of corn and butter may be, and another portion of it into fat, and another portion of it into manure, for that is the natural result of the chemical change produced in the laboratory of the cow's stomach. The same result will follow any other kind of feeding. Good pasture will produce an abundance of milk, often as much as the cow can carry; but does it follow that even then it will not be profitable to feed her with some more oleaginous food to increase the quantity of butter just as it sometimes proves profitable to feed bees to enable them to store more honey. It certainly does appear to us that the value of a cow, feeding upon ordinary winter food, may be almost double by making that food suitable for the purpose of increasing the quantity of milk, if that is the purpose for which the cow is kept. Farmers generally understand that they can convert corn into beef, pork and lard, and some of them know exactly at what price per bushel it will pay to convert it into these substances; but does any one know at what rate it will pay to convert corn or any other grain into butter, or any other kind of feed into the dairy products? Is the whole business a hap-hazard one? We fear so. Some persons know that they can increase the saleable value of butter by adding the coloring matter of carrots to it. Does any person know the value of a bushel of carrots fed to a cow to increase her value as a butter-producing laboratory? Experimental proof upon this point would be far more worthy of agricultural prizes than it is to see who can show the largest sized roots; for by a few carefully conducted experiments we should be able to increase the value of a cow almost at pleasure.—*N. Y. Tribune.*

Curious Relic of '45.—Some men were lately employed cutting peats for the Misses Macdonald, of Coul, in Badenoch, when one of their number, John Macdonald Crachie, came upon a dish containing about a stone of butter buried about a foot and a half beneath the surface. The dish fell to pieces on removing it, but the butter was quite fresh. In olden times, says our correspondent, the place was used as a 'sheiling' for cattle, but that is a story of at least eighty years ago, so perhaps, the butter had been lying there since the "Forty-five;" for when soldiers were ranging through the country, lifting cattle and all goods that they could lay their hands upon, the guidwives of the day, whenever they heard of the red-coats coming the way, used to hide their gear wherever they could, and the nearest bog was often a favorite place for deposits. —*Inverness Courier.*

University College, Toronto.

THE Lectures in this Institution on THE SCIENCE AND PRACTICE OF AGRICULTURE, will commence on MONDAY, NOVEMBER the 1st, and will be continued (five lectures a week), till the beginning of April, 1859. Agricultural students can attend other courses, such as Chemistry, Geology and Mineralogy, Natural History, including Botany, English Language and Literature, &c., as they may desire.

Particulars may be obtained by applying either personally or by letter to Professor Buckland, University College, Toronto.

Toronto, August, 1858.

FOR SALE.

FIFTEEN THOROUGH-BRED AYRSHIRE CATTLE: BULLS, COWS AND HEIFERS of various ages. Apply to Mr. Denison, at his residence, or at the office of the Board of Agriculture.

Toronto, August 4th, 1858

THE

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AND

JOURNAL OF THE BOARD OF AGRICULTURE

OF UPPER CANADA.

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MANUFACTURED FOODS FOR CATTLE.

Among the most obvious and important improvements in modern agriculture may justly be included the superior breeding and management of live stock. It is now well understood, and in some degree generally practised, that the improved breeds of the domesticated animals of the farm, in order to sustain their excellence, necessarily require a liberal and systematic course of feeding. Hence the general introduction of root crops into arable husbandry; the cutting of hay and straw, and steaming them with turnips, carrots, linseed, &c., for the sustentation of animals. These processes have unquestionably been marked improvements; a much less amount of raw food, by mixture and artificial preparation, has been made to support and fatten cattle in a much more effectual manner than could have possibly been accomplished under the old systems of agricultural routine.

Very recently a bold step in advance has professedly been taken in England, which, if one half that has been said of it be true, it would mark quite a distinct and important era in this department of agricultural progress. Foods artificially composed, containing nutritious ingredients, it is said, in a highly concentrated state, have been offered to the farmer; and as some of these have found their way into Canada (Thorley's for instance,) our readers may not feel altogether uninterested in the subsequent remarks.

In the last part that has come to us of the *Journal of the Royal Agricultural Society of England*, a very clever paper appears from the pen of that extensive and well known experimentalist, J. B. Lawes, Esq., F.R.S., on this interesting and important subject. As we have not had the opportunity of testing any of these preparations, nor of knowing any one who has on this side the Atlantic, we will endeavour to place in a familiar light the results at which Mr. Lawes has arrived after a careful investigation of the subject.

It would appear that the cost of these manufactured foods is from 40s. to 50s. sterling per cwt. Taking the ordinary stock foods at the current market prices in England, such as hay, linseed, and the different kinds of grain, it appears that, weight for weight, they are only a fourth or fifth of the cost of these manufactured compositions. Very undeniable evidence of their superiority when given in much smaller quantities should be required to induce the farmer extensively to employ them. The following is the result of an analysis of one of these foods, as performed in Mr. Lawes's laboratory at Rothamsted :—

Water	12.86
Nitrogenous substances	15.51
Fatty matter	6.22
Starch, sugar, &c.	55.97
Woody fibre	5.50
Mineral matter	3.94
	100.00

Now, independently of coloring matter and flavoring with cumin, anise, or other stimulating seeds used in cattle medicine, which these foods frequently exhibit, the constituents stated in the above table could be readily supplied by a mixture of barley-meal, with peas, beans, and linseed, at a cost of about one-fourth of the price of the manufactured cattle food.

We subjoin, in a tabulated form, the results of a practical trial of the food, the proximate analysis of which is above recorded. The plan of the experiment is stated to have been as follows:—six pigs were selected and divided into two lots of three each, the collective weights of the respective lots differing from one another by only 2 lbs. To lot No. 1 a mixture was given, composed of nine parts barley-meal and one part bran. To lot No. 2 the same mixture of barley meal and bran was given, with the addition of two parts of the manufactured food to every ten parts of the barley and bran mixture. The food was in each case stirred up with hot water, and both lots were allowed as much of their respective foods as they choose to eat. The results of this comparative experiment were as follows:—

Description of Food.	No of Pigs.	Duration of Experm't (Days).	Original Weight.	Final Weight.	Increase.	Total food consumed	Food consumed to produce 100 of Increase.
			lbs.	lbs.	lbs.	lbs.	
Lot 1. Nine parts Barley meal, one part Bran	3	28	357	496	139	547	393
Lot 2. Nine parts Barley meal, one part Barn, two parts manufactured food	3	28	355	494	139	556	400

The amount of increase for a given quantity of food consumed was in both cases good. It is obvious, however, that so far from there being less total food consumed when the manufactured meal was employed, there were 9 lbs. more of the mixture eaten when one-sixth of it consisted of the expensive manufactured

food; whilst the amount of increase in weight was exactly the same in the two cases. In fact, the results are so nearly absolutely identical that the difference cannot, perhaps, be fairly attributed to any intrinsic difference in the character of the food. But it is, at any rate, clear that nothing was gained by adding to the barley meal and bran one-fifth of its weight of food costing about five times as much money.

It is recommended that these foods be used in comparatively small proportion to the total food consumed; the animals thus having mainly to rely on ordinary food, the comparatively innutritious matters of which, such as bran, straw, &c., are thereby rendered palatable and nutritious. Mr. Lawes however, contends that no evidence has been brought forward to show that these manufactured foods will so stimulate digestion as either to extract more of its already existing nutritious matters, or to render the woody fibre of the coarse foods mentioned more directly serviceable to the nourishment of the animals. All kinds of live stock, especially such as are in a growing or fattening state, require, in their daily food, a given amount of digestible constituents; such as starch, sugar, pectine, gum, oil, nitrogenous compounds, &c., all of which they must obtain from their food. No condiment or highly concentrated preparations, by acting as a stimulant, can adequately supply the waste and wants of the body, caused by respiration and perspiration, the loss by urine and fœces; the gain therefore in weight of fat, flesh, bone, &c., must all come from constituents actually contained in the food.

Mr. Lawes refers to some very elaborate experiments which he made on the feeding of animals at Rothamsted several years ago,—the results of which were published in the agricultural and scientific journals of the day,—when it was clearly ascertained that the ordinary foods, when in proper admixture with one another, supplied the several constituents far more economically, than mixtures in which some of the constituents, (starch, sugar or oil, for instance) were employed in a comparatively pure state. So that unless cheaper sources of food can be discovered than exist in hay and grain, &c., we cannot hope effectually and economically to replace the latter by any special manufactured foods for stock. It has been urged by the venders of concentrated foods that, as plants are rapidly pushed on by special, stimulating manures, so can the growth of animals by the prepared foods in question. But the analogy between plants and animals in this respect does not hold good. The supply of waste and increase of bulk in animals, it has been shown, are effected by the supply of materials contained in the ordinary food supplied them; whereas the greater bulk of matter contained in the plant is not derived from any special, concentrated, stimulating manure that may be applied, but essentially consists from materials derived from the atmosphere, and such as naturally belong to the soil, and are therefore dependent only in a subordinate degree on the will or skill of man.

Mr. Lawes further observes, that the virtues which such preparations do really possess over and above those which could be secured at one-fourth or one-

fifth the price, are confined to the action on the health and digestion of the animals of the small amount of stimulating and carminative seeds which they contain. In fact, so far, they are sauce or medicine, rather than food. As such they are likely rather to increase than to diminish the appetite for further nutriment. Still, it is possible that, if judiciously compounded, they may be of service in keeping horses in a more healthy state of body, or in aiding the digestive powers of weakly animals. Still it should always be borne in mind that such preparations can never supply, in the ordinary way, the proper amount of the necessary ingredient contained in ordinary food. "I feel bound to say [observes Mr. Lawes,] that I should require much clearer evidence than any that has hitherto been adduced, to satisfy me that the balance-sheet of my farm would present a more satisfactory result at the end of the year were I to give to each horse, ox, sheep, and pig, a daily allowance of one of these costly foods."

THE PROGRESS OF ENGLISH AGRICULTURE.

Continued from Page 210.

The farmers were too often worthy of their ploughs. In Leicestershire, where rich pastures made tenants indifferent to careful cultivation, the present president of the Royal Agricultural Society, Lord Berners, found the farmers, as late as 1825, intentionally ploughing crooked with a long string of horses; and the Duke of Rutland, when in the chair at an agricultural meeting, was alarmed lest a storm of disapprobation should disturb the harmony of the day, because Lord Berners' brother ventured to suggest ploughing straight as a first step toward improvement, and exchanging the strings of slow hairy-legged horses for curricle pairs of lively steppers. Young calculated that at least one-half of the draught cattle might have been saved in Essex. The long file of men and beasts which were wasted upon the work provoked his indignation. He exhorted the farmers to raise less oats and more wheat, and to expend their summer provender in fattening bullocks, which were food for man, instead of maintaining superfluous horses, whose ultimate destiny was to furnish food for the kennel. Truths which to us seem truisms were heresies then, and such a simple suggestion as that of Young was distasteful to many a farmer of the olden time. There is no ground to triumph over them, for they were what their circumstances made them, but we may at least rejoice that the present system gives us an ox to eat where our ancestors had a horse to feed.

The pecuniary gains of agricultural progress are not to be estimated by the mere saving in wages, horse-labor, seed, or manure. Thorough draining not only diminishes the cost of ploughing, but it renders it possible to grow great crops of roots—of mangold-wurzel from thirty to thirty-five tons an acre, and of turnips from twenty to twenty-five tons. Ten times more live stock is thus fed on the land than it maintained before. The corn crop follows the roots in due course without further manuring, and is made certain, in addition, even in wet seasons. The well-shaped modern plough saves in horse-labor, as compared with the clumsy old-fashioned swing-plough, a sum which can only be calculated in reference to the tenacity of each kind of soil, but which on an average exceeds the power of *one* horse, besides enabling youths, skilful but not strong, to act as ploughmen, encouraging deep ploughing, the foundation on the best

land of good root crops. The advantage of the drill over broadcasting is not only in the smaller quantity of seed and manure required, or in the power to sow seed and manure together, or in its permitting the use of the horse-shoe, though these effect a saving in money equal to one-fourth of the value of the crop; but its great saving in the moist uncertain climate of England is time.—A day's delay in sowing by hand has lost many a season, whereas one horse-drill does the work of fifteen men. The clod-crusher, again, reduces the lumps to tilth, that no wooden "beetle," no loaded "sledge," no army of clotters could have broken, while on light land it gives consistence to the soil, making thousands of acres of corn stand upright which would otherwise have been rotting on the ground.

Under high farming, the manual labor employed is both increased and concentrated. A greater number of men are required per acre, and a lesser number in proportion to the produce. With mechanical assistance the crops are less dependent on the seasons, and each operation is more quickly performed. With improved breeding the stock is increased in quantity, more early and matured, and bears finer and more profitable meat. Four-year-old horned sheep are replaced by mutton grown in thirteen months. The aged cows or worn-out oxen, which form the staple of the continental meat-markets, lose from fifteen to twenty per cent. more in cooking than our well-fattened oxen and heifers, to say nothing of the difference in the quality of the flesh. At every stage the farmer who farms for money profits—not like the backwoodsman, the metayer, or peasant proprietor, merely to feed his family — loses by rude implements, ignorant cultivation, and coarse-bred live-stock. At every stage of progress the modern English farm becomes more like a manufactory, producing on a limited surface enormous quantities of food for man, turning Peruvian guano into corn, bones from the Pampas into roots, Russian oil-cake, Egyptian beans, Syrian locust-pods, into beef and mutton. The gain to the farmer and the landlord is, we repeat, the most insignificant part of the benefit. The agriculturist is the manufacturer of food for the nation, and upon his skill, under Providence, it depends whether plenty or scarcity prevails in the land.

To give some idea of the modern system of English agriculture, we subjoin a brief description of three farms in three different districts of England — the first, a light land self-drained; the second, clay, sand, and good pasture; the third, stiff clay; and all cultivated by tenants who have not expended money to purchase glory, but who have invested capital in order to earn a profit.

Mr. John Hudson, whose name is familiar to all English, and many French and German, agriculturists, began farming half a century ago. In 1822 he entered upon his now celebrated farm of Castle Acre, which consists of self-drained land, and is a fair specimen of the Norfolk light soil. At that period the only portable manure was rape-cake, which cost £13 a ton, and did not produce any visible effect upon the crops for a month. The whole live-stock consisted of 200 sheep and 40 cattle of the old Norfolk breed. He adopted what was then the new, now the old, and what is perhaps destined to become the obsolete four-course Norfolk system—that is to say, 250 acres pasture, 300 wheat, 300 barley; or, in dear years, 600 wheat, 300 roots, and 300 seeds, the rest being gardens and coverts. On these 1200 acres he at present maintains 10 dairy cows, 36 cart-horses, a flock of 400 breeding ewes, and fattens and sells 250 Short-horns, Herefords, Devons, or Scots, and 3000 Down sheep. The crops of swedes average from 25 to 30 tons, the mangold-wurzel from 30 to 35 tons per acre. His wheat had, in 1855, averaged, for the previous five years, 48 bushels per acre; the barley 56 bushels. Of the seeds, the clover is mowed for hay, the trefoil and white clover are fed down by sheep, and there are no bare fallows. The purchased food given to the cattle in the straw-yards and

sheds, and to the sheep in the field, consisting of oil-cake, meal, and beans, cost £2,000 a-year. The greater part of this oil-cake is charged to manure, which it enriches in quality as well as increases in quantity; but the direct expenditure on artificial manures—guano, nitrate of soda, and superphosphate of lime—amounts in addition to £1,000 a-year. Wages absorb from £2,600 to £3,000 a-year. Seven or eight waggon-loads per acre of farmyard-manure are ploughed in on land intended for roots, besides above 30s. worth per acre of superphosphate of lime drilled in with the turnip-seed; while wheat has a top-dressing of 1 cwt. of guano, ½ cwt. of nitrate of soda, and 2 cwt. of salt, mixed with earth and ashes. No weeds are grown. The turnips are taken up in November, and a troop, called by the vile name of a "gang," consisting of "boys and girls," under the care of an experienced man, traverse the ground, forking out and burning every particle of twitch or thistle. The same "troop" is called in during the progress of the-root-crop whenever occasion requires, and immediately after harvest they go over the stubbles with their little three-pronged forks, exterminating the slightest vestige of a weed. The expenses of cleaning are thus kept down to 1s. an acre, a price which excited the admiration and doubts of that admirable agricultural essayist, the late Mr. Thomas Gisborne, and which proves that, by stopping the evil at the source, and never allowing the enemy to get ahead, land may be kept wholly weeded more cheaply than half weeded. Lord Berners mentioned as recently as 1855 that he found in Leicestershire hundreds of acres netted over with twitch as thick as a Life-guardsman's cane, and studded with clumps of thistles like bushes. Such neglected land required an expenditure of £5 to £6 an acre to put it in heart. The farmer who saw a thief daily stealing from his dung-heap, would soon call in the aid of a policeman. The weeds are an army of scattered thieves, and, if the pilferings of each are small in amount, the aggregate is immense. The wise and thrifty farmer, therefore, keeps his constabulary to take up the offender, and consign him as quickly as possible to death. He who allows himself to be daily robbed of his crop, and the community to the same extent of food, and all the while looks helplessly on, is not only a bad farmer, but in effect, though not in design, a bad citizen also.

Mr. J. Thomas, of Lidlington Park, our second example, farms about 800 acres of a mixed character under the Duke of Bedford, of whom it is the highest praise to say that he is a landlord worthy of such tenants, consisting in part of clay, which has been rendered profitable for arable cultivation by deep drainage, and in part of what is locally called sand, which has been reduced from rabbit-warrens to corn-fields by the Norfolk system. This intelligent cultivator read a paper some time since to the Central Farmers' Club, in which he stated, with the assent of his tenant audience, that, under very high farming, it was not only possible but advisable to reduce the fertility of the soil by the more frequent growth of grain—as, for instance, by taking barley after wheat, and returning to the once fatal system of two white crops in succession. He said that, under the four or five-course he began to find his "turnips subject to strange, inexplicable diseases; his barley (where a large crop of swedes had been fed on the ground by sheep, with the addition of cake or corn) laid flat on the ground by its own weight, and in a wet harvest sprouted, thus rendering the grain unfit for the maltster, the straw valueless as fodder, while the young clover was stifled and killed by the lodgment of the barley crop." Thus, while Roman agriculturists, with all their garden-like care, were tormented by a decreasing produce, on an exhausted soil, we, after ages of cropping, have arrived at the point of an over-abundant fertility—an evil to be cured, not by any fixed rule, but "by permitting the diligent and intelligent tenant-farmer a freer exercise of judgment." In this speaker we have another specimen of the

invaluable class of men by whom, during the last ten years, on tens of thousands of acres, the produce of meat and corn has been doubled.

At Lidlington, where there is strong clay to deal with, and more good grass-land than exists at Castle Acre, it is not necessary to purchase so much food to keep live-stock for manure. But there are about one hundred and fifty beasts and one thousand sheep sold fat, besides a choice breeding flock of four hundred Downs, the result of twenty years' care. By these sheep the light land is consolidated and enriched. If they are store sheep they are allowed to gnaw the turnips on the ground for part of the year; if they are young and to be fatted for market, the turnips are drawn, topped, tailed, and sliced by a boy with a portable machine. Thus feeding by day and penned successively over every part of the field by night, they fertilize and compress, as effectually as any roller, the light-blowing sand, and prepare soil which would scarcely feed a family of rabbits for luxuriant corn-crops. The cattle, consisting of two-year-old Devons, Hereford, or short-horns, or three-year-old Scots or Anglesea runts, purchased at fairs according to the supply and market-price, in spring or summer, are run on the inferior pasture until winter, then taken into the yards or stalls, fed with hay, swedes, mangold, ground cake, linseed, or barley meal, and allowed an unlimited supply of clean water. When the spring comes round they are put on the best grass, and sent off to market as fast as they become ripe, having left behind them a store of manure, which is the capital from which everything else must spring.

Ten years ago four miles of rough bark fences were cleared away on the clay half of this farm, and replaced by single rows of blackthorn, dividing the fields into square lots of forty or fifty acres. Under the old system two hundred acres were poor pasture; now under the rotation system the strong clay feeds four times as much live-stock as before, and bears wheat at least twice in six years. According to the latest experience, the most profitable system in its present light condition would be, to devote the farmyard dung to growing clover, to eat down the clover with folded sheep, and then to use the ground fertilized by the roots of the clover, without home-made manure, for cereal crops, assisted by a top-dressing of guano, to be followed by roots nourished with superphosphate of lime. Good implements come in aid of good methods of cultivation. Mr. Thomas has eight or nine of Howard's iron ploughs—both light and heavy—iron harrows to match the ploughs, a cultivator to stir the earth, a grubber to gather weeds, half a dozen drills, manure distributors, and horse-hoes, a clod-crusher, a heavy stone-roller, a haymaking-machine, and horse-rakes. Reaping machines are to follow. To deal with the crops, a fixed steam-engine, under the care of a plough-boy, puts in motion the compendious barn machinery we have already described, which threshes, dresses, and divides the corn according to its quality, and raises the straw into the loft, and the grain into the granary, besides working a chaff-cutter, a bean-splitter, a cake-crusher, and stones for grinding corn or linseed. With machinery no large barn is required in the English climate; the corn can remain in the rick until required for market.—About twenty men and thirty trained boys, under an aged chief, are constantly employed.

No land is here lost by unnecessary fences; no food is wasted on ill-bred live-stock; no fertility is consumed by weeds; no time or labor is thrown away. One crop prepares the way for another, and the wheeled plough, under the charge of a man or boy, follows quick upon the footsteps of the reaper. The sheep stock is kept up to perfection of form by retaining only the best-shaped ewe-lambs, and hiring or buying the best South-down rams. The profit of keeping first-class stock was proved at the Christmas market of 1856, when twenty-five pure Down shearlings, of twenty months old, which were sold by

auction at Hitchin, made an average of £4 8s. each, being nearly double the usual weight. The large produce, whether in corn or meat, is the result of a system the very converse of that practised by the Belgian peasant proprietor, or French metayer, whose main object is to feed his family, and avoid every possible payment in cash. As for laying out sixpence on manure, or cattle food for making manure, no such notion ever crosses the minds of those industrious hard-living peasants, and the diminution in the means of subsistence in consequence, is almost past calculation. He who puts most into the land, and gets most out of it, is the true farmer. The bad cultivator gives little, and receives accordingly.

When the Central Farmers' Club discussed the advantage of returning to the plan of more frequent corn crops, which before the days of artificial manures was found to be utterly ruinous, the then chairman said that he "had for several years taken a crop of wheat every other year; and that on such soil as that of his farm, as long as he manured accordingly, he considered that he was not using the land (one-half of which is his own freehold) unfairly." This Weald of Sussex farm shall be our third example; and we adduce it to show what may be done with the most intractable class of retentive soils. A few years ago it was divided into enclosures of from four to eight acres each by broad hedgerows, many of them with ditches on both sides. It was among the evils of these small enclosures that they facilitated the old make-shift plan of draining by surface furrows to shallow sub-drains of bushes, because the water had not far to run. A partial cure postpones complete remedies. In the numerous hedges, according to the custom of the county, the landlord grew oak timber and the tenant underwood for fuel and for mending fences. Before railways had made coal cheaper than hedgerow cuttings, the laborers were employed in fine weather during the winter in trimming the hedges, and clearing out furrows and ditches; in wet weather they retreated to a large barn and threshed out wheat or oats with a flail, in a damp atmosphere the most unfavorable for the condition of the corn, and a time of the year most convenient for pilfering it. The usual course of cropping was—1, fallow; 2, wheat; 3, oats; 4, seeds. The seed crop were fed until the beginning of June with all the stock of the farm, and then broken up for a bare fallow with a wooden turnwrist plough.—The crops were about twenty bushels of wheat per acre once in four years, about forty-eight bushels of oats the year following, and hay and seeds in the third year. The stock consisted of about twenty-five cows, and ten young beasts, which were sold half-fat. The horses ploughed four at a time in a line, and were usually the plumpest animals on farm. Sheep there were none, nor was it believed possible to keep them without Down feed. Lime was the only manure purchased, and hay the only winter food. The present owner and farmer of Ockley Manor, after travelling through England to study the best specimen of modern tenant-farming, began by reducing a hundred enclosures to twenty, and by borrowing enough money from the public loan to drain the whole of his clays, the stiffest imaginable, three feet six inches deep. He would have preferred four feet deep, but the expense lopped off six inches. This indispensable preliminary process enables him to grow roots and keep a large stock of Southdown sheep on his clovers and seeds, with plenty of cake, running them on the land almost all the year round. To assist in disintegrating the drained clay he avails himself of "Warne's box-feeding" system, manufacturing a large quantity of long straw-dung, which, when ploughed in, exercises a mechanical as well as a fertilizing effect.

There are three modes of feeding cattle in use—open yards, stalls, and boxes. Well-built yards are surrounded by sheds for shelter, the open space is dish-shaped, thinly sprinkled with earth, and thickly covered with straw, which is

renewed from time to time as the cattle trample it into manure. The roofs of all the surrounding buildings are provided with gutters, and the rain is carried into underground drains. The liquid manure is pumped back upon the prepared dung-heaps. These yards are attached to all root-feeding farms, and by their appearance and the quality of the cattle fed in them a fair opinion may be formed of the management of the tenant. In stalls the cattle are tied by the head under cover, with more or less straw under them according to the proportion of arable land. On the "box system" each beast is penned in a separate compartment under cover, and supplied from day to day with just as much straw as will cover the solids and absorb the liquid dung. By the time the beast is fat his cell is full of solid well fermented manure, of the most valuable description for clay land. The cattle, whether in yards, stables, or boxes, and all are often to be found on the same farm, ought to be bountifully fed with sliced or pulped roots mixed with chaff, hay, oil-cake, linseed, or corn. The extra buildings make boxes the most expensive plan, but in no way do the animals thrive better, and where there is an ample supply of straw it is the most advantageous method of manufacturing manure. Box-feeding affords one more instance of the antiquity of many modern agricultural practices. In Sir John Sinclair's "Statistical Survey of Scotland," published 1795, we read that in the Shetland Island of Unst, "The method of preserving manure is by leaving it to accumulate in the beast-house under the cattle, mixed with layers of grass and short heather, till the beasts cannot enter. When the house is full the dung is spread over the fields." Doubtless the islanders of Unst found, in their damp climate, that dung collected out of doors lost all its fertilizing value. At Ockley farm, with the assistance of the grass-land, from one hundred to one hundred and twenty of the best class of Sussex, or Devons, or Scots, are fattened every year in boxes, built cheaply enough of the timber from the condemned hedgerows, interlaced with furze and plastered with Sussex mud. Though not very sumptuous externally, they are warm and well ventilated. Twenty Alderney cows eat up what the fat cattle leave on the pastures (each cow being tethered), and supply first-class butter for Brighton—a market which requires the best description of farm produce. In manufacturing districts quantity pays the grazier or dairyman the best, in fashionable quarters quality. Eight hundred fat Down sheep and lambs, and about eighty pigs, which are sold off cheaply in the shape of what is popularly called "dairy-fed pork," complete the animal results on this Weald of Sussex farm.

On four hundred and fifty acres devoted to arable cultivation wheat is grown every alternate year, at the rate of from forty to forty-eight bushels per acre.—The sheep and lambs, which get fat on the clover or other seeds, assisted by cake, prepare the soil for the alternate corn crops, and have doubled the original produce. The roots fatten the cattle in boxes, and, while they are growing ripe for the butcher, they manufacture the long straw manure, which both enriches the tenacious soil, and by its fermentation assists to break it up. Space, light, and air have been gained by clearing away huge fences, which, besides their other evils, harbored hundreds of corn-consuming vermin. By these and such-like methods, all novelties in Sussex, the produce of the farm has in ten years been trebled, and the condition of the soil incalculably improved; and all would have been vain, and much of it impossible, without the adoption of deep, thorough gridiron drainage. This has done in the Weald of Sussex clay what sheep-feeding and drill-husbandry did for the warrens of Norfolk, the sands of Bedford, and the Downs of Wiltshire and Dorsetshire. The result, however, is not so satisfactory in a profitable point of view as in light land counties, because, as Talpa has shown in his "Annals of a Clay Farm," it is almost impossible on a retentive soil, with any paying number of horses, to get through more than

one-third of the ploughing before winter sets in, with its rain and snow. The cultivators of the farms which from their natural fertility in dry seasons were in favor for centuries, while what are now our finest corn-growing districts were Moorland deserts, are often beaten by time, prevented as they are by the wet from getting on the land, and obliged to work slowly with three or four horses. Yet on autumnal cultivation depends the security of the root-crops—and the root-crops are like the agricultural "Tortoise" of Indian mythology, the basis on which rests the rent-paying corn crop. Much, therefore, as deep drainage has done for advanced farmers on retentive clays, it has not done enough, and they look anxiously forward for the time when a perfect *steam cultivator* will make them independent of animal power, and enable them, if needful, to work night as well as day during every hour of dry weather.

We have not thought it necessary to dwell upon any of those profitless agricultural miracles which are from time to time performed, to the great amazement of the class with whom turnips are only associated with boiled legs of mutton, and mangold-wurzel with salad. As little have we cared to describe liquid-manure farms, netted over with iron pipes, irrigated by hose and jet, and a perpetually pumping steam-engine, for the simple reason that, while deep drains, guano, superphosphate of lime, long straw manure, and other aids to agriculture introduced within the last fifteen years, give an early result, liquid manure, under an English sun, has never been proved to be effective, except for grass crops on a dairy farm. We have contented ourselves with selecting illustrations which, though not specimens of perfection in every department, for they all have defects, and in two out of three the buildings and implements might easily be improved, are yet fair types of the system of cultivation which is making rapid progress through every district of England. These are farms which are cultivated on commercial principles, instead of being mainly expensive raree-shows—farms which pay fair rents, and return fair profits, and yield an amount of meat and corn which is at least double that raised by unintelligent farmers in England, and above fourfold that obtained from a more fertile soil and genial sun by the peasant proprietors of France and Germany.

In the absence of agricultural statistics, we have no exact data for comparing the produce of England before and since the era of "high farming;" but the following figures will convey some idea of the fixed and floating capital invested by landlords and tenants in modern improvements. Since 1839 at least twelve hundred thousand tons of guano have been imported, for which not less than twelve millions sterling have been paid. In the year 1837 the foreign bones imported were valued by the Custom House authorities at £250,000. After that date we have no return, but since 1840 one million at least has been paid annually for bones, sulphuric acid, and artificial manures, independently of guano. Since 1846 at least sixteen millions have been invested in deep thorough drainage. Thus we have an expenditure of upwards of thirty millions, without counting the value of new implements and machines, purchased every year by thousands, or the large sums laid out in adding to the productive acreage of farms by throwing down useless hedgerows, or in rebuilding the rude homesteads that served the preceding agricultural generation, and in replacing the inferior local breeds of stock by better animals suited to the soil and climate.

There are other facts which are full as significant. In 1847 the proprietor of a now prosperous school of agricultural chemistry could not, out of a large number of pupils, find one who was willing to be gratuitously instructed in the science for which farmers willingly pay him at present a heavy extra fee. Even Mr. Pusey, who devoted his life to improvements in cultivation, made the mistake, in his last report, of undervaluing the services which chemistry had rendered to agriculture. Such, however, is found to be its practical value, that the

demands of farmers have created a class of chemists who make the relative value of manures and artificial food and the constituents of soils their especial study. To such inquiries Mr. Lawes devotes the Rothamsted experimental farm and laboratory, an establishment over which Dr. Gilbert presides, at an expense for the last fifteen years of more than £1000 a year. Professor Way, who has lately been succeeded by Professor Voelcker, was bound by his appointment under the Royal Agricultural Society to supply analyses to the subscribers at certain low fixed rates, and he was amply employed by the tenant-farmer community. In the West of England, long considered the very Bœotia of agriculture, Professor Voelcker delivered last year at Exeter, Barnstaple, and Newton Abbott, at the request of the Bath and West of England Agricultural Society, a series of most admirable lectures, the results of experiments carried on at Cirencester, on such subjects as 'The Value of Artificial Manures,' 'Farm Yard Manures,' 'The Composition of Fertile and Barren Soils,' 'The Nutritive Value of different Oil-cakes.' In 1840 there was no chemist sufficiently familiar with farming to treat usefully on these topics; and if he could have talked the very quintessence of practical wisdom, there certainly was no agricultural audience prepared to listen to him. That he spoke the language of science would of itself have been sufficient to convince the tenantry throughout the country that he did not speak the language of common sense. It is true that Coke of Holkham, with his usual acuteness, had long before invited the attention of Sir Humphry Davy to the chemistry of agriculture, and even specially retained a Mr. Grisewood's services for Norfolk; but the public were not yet ripe for instruction, and the lever of superphosphate of lime and guano was wanting to move their minds from traditionary routine. From that period the work went on with railroad celerity. When Mr. Josiah Parkes called on Mr. Handley in 1837, he found him experimenting on 'a new manure called guano.' Ten years later, although the consumption was enormous, many farmers looked upon its use as a sort of treason, and met innovators with a maxim, which is in one sense sound: "Nothing like muck.' Others equally ignorant but more enterprising used it freely, and grew great crops without caring to know the reason why. The desire to ascertain the reason why quickly followed, and has already converted many a farmer into a creature of reason from a creature of rule-of-thumb.

If it be asked what has been practically gained within the last twenty years by the investigations of the agricultural chemist, we would answer, *certainty*. We knew years ago, that farmyard manure was excellent; by the light of chemical science we learn why it is 'perfect universal manure,' we learn how to manufacture and employ it best, and we learn why on clay soils it may be safely, nay advantageously, left for weeks on the surface before being ploughed in. Chemical science again teaches us why lime, which is not an active manure, although valuable as a destroyer of elements hostile to fertility, produces great effect for a series of years, and then not unfrequently ceases to show any profitable results; it teaches us to what crops guano, to what superphosphate of lime, to what farmyard manure may be most profitably applied, and when a mixture of all three. Chemistry settles the comparative value of linseed cake, cotton cake, and karob beans; shows when pulse should be used for fattening pigs, and how to compound a mixture of Indian corn and bean-meal which shall produce fat bacon neither hard nor wasteful. The conclusions of science were previously known empirically to a few, but their range was limited and their application accidental. They have been reduced to order and rendered universally available for the use of plain farmers by the investigations of men like Lawes and Voelcker. As the latter observes, 'there are too many modifying influences of soil, climate, season, &c., to enable us to establish any invariable laws for the guidance of the husbandman; but the more we can trace effects to their causes and ascertain the

mode in which nature operates, the nearer we are to fixed principles and a sure rule of practice.

It would seem then that the first great epoch of modern agricultural improvement began with Lord Townshend, who demonstrated the truth embodied in the adage,

"He who marls sand
May buy the land,"

showed the value of the turnip, and, as we presume, must have been a patron of the four-course system, which had its rise in Norfolk about the same time. The second epoch was that of Bakewell, whose principles of stock-breeding have ever since continued to raise, year by year, the average value of our meat-producing animals. The third epoch dates from the exertions of such men as the Duke of Bedford and Coke of Holkham, the latter of whom, combining usages which had been very partially acted upon, brought into favour drilled turnip husbandry, carried all the branches of farming as far as was permitted by the knowledge of his time, and did the inestimable service of inoculating hundreds of landlords and tenants with his own views. The fourth epoch, if we were to take each advance from its earliest dawn, would comprise the various dates of the opening of the first railroad, the importation of the first cargo of guano, the publication of Liebig's first edition of the 'Chemistry of Agriculture,' and the deep draining of the Bonesetter's field on Chat Moss; but in general terms it may be said to date from the first meeting of the Royal Agricultural Society at Oxford in 1839, when farmers began to be familiarized with men of science, and men of science learned not to despise agricultural experience. This last era is almost the birth of yesterday, and already, as compared with any former period, the results read more like a page from the Arabian Nights than like a chapter in the history of agricultural progress. Deep drainage, artificial manures, artificial food, improved implements, and railroad conveyance, have been the leading means by which the change has been wrought. Deep drainage has brought into play the unexhausted fertility of our strong clays: portable manures and purchased food have increased the crops on land of every degree. Mangold and swedes have been made to flourish on stiff soils, and cereals on sieve-like sands. Downs have been transformed from bare pastures to heavy root and rich grain-bearing fields. The visitors to Salisbury Plain at the agricultural show of 1857 were surprised to find a large part of it converted into productive corn-land—a change which has been almost entirely effected within the last twenty years. The scientific mechanic has provided the tools and machinery for breaking up and pulverizing the ground, for sowing the seed, for gathering the crops, for preparing it for market, for crushing or cutting the food for the stock, with an ease, a quickness, and a perfection unknown before. The railroad is the connecting medium which maintains the vast circulation, conveying the agencies of production to the farmer, and the produce of the farmer to the market. The steam-cultivator is, perhaps, about to be added to the triumphs of mechanism, and then will be realized the expression in the fine lines of Mr. Thackeray on the Great Exhibition of 1851—an expression which was premature if it was intended to be historic, but which we hope, and almost believe, will prove to be prophetic.

"Look yonder where the engines toil;
These England's arms of conquest are,
The trophies of her bloodless war;
Brave weapons these.

Victorious over wave and soil,
With these she sails, she weaves, she *tills*,
Pierces the everlasting hills
And spans the seas."

To be Continued.

MR. JONAS WEBB'S SHEEP SHOW.

It is again our pleasing duty to record the ovine triumphs of Mr. Jonas Webb, whose celebrity as a breeder of Southdowns has now become a historical fact. The Babraham sheep show of 1858 was held on Friday, the 16th ult., and notwithstanding several heavy showers which fell fast just before the commencement of business, there was a very large attendance of gentry and agriculturists. It could not be denied, however, that the rain detracted somewhat from the comfort of the visitors, to whom the Babraham show, and Mr. Webb's hospitable house and pleasant grounds, constitute an annual treat, all the more enjoyable when no umbrella intervenes between their eye-sight and the blue sky.

It would be supererogatory to enter now into the merits of the Babraham flock, which each succeeding year only serves to bring out in a stronger relief; let it suffice to say, that they have not deteriorated in the excellence of their quality; on the contrary they have improved, if it be possible to improve upon perfection. The letting took place in the usual paddock, in which tents had been erected as a protection against the rain. On this occasion the premier ram was hired for 75 guineas, the weight of his wool was 8lbs. 8oz.

The fleece of one animal weighed the enormous weight of 12 lb. 8 oz., the average weight of wool being about 8 lb.

The following is the highest price fetched at the last three lettings:—

1855	....	170 guineas.
1856	....	150 "
1857	....	197 "

and the accompanying list shows the number of rams let, and the average price per head for the last six years:—

	Number Let.	Average Price.
1852	69	£22 3 1
1853	71	22 6 3
1854	75	25 4 3
1855	77	25 15 2
1856	77	33 1 4½
1857	65	27 17 7½

This year the average figure was £21, a slight falling off, which may be accounted for by the state of the weather. Sixty-one sheep were let.

The company on the ground included visitors from almost every country and district where Mr. Webb's successes are known and appreciated; it were vain to attempt to give anything like a list of them.—*Cambridge Chronicle.*

THE PROBABLE YIELD OF THE LAST HARVEST.

To the Editor of the Agriculturist.

Bureau of Agriculture and Statistics,
October 16, 1858.

Sir,—Having received one hundred returns from Municipalities and from private individuals, many of whom state that they have consulted other parties likely to give correct and truthful information, with regard to the probable yield of the crops of 1858, I am desirous of laying the result before the public, as it may be important to know what we are to expect with regard to the probable supply of grain, &c., in our markets this season, and thence the probable export as compared with other seasons.

The hundred returns are the united opinions of about five hundred of the most intelligent farmers, and have all the appearance of truthfulness.

They comprise fourteen from Lower Canada, from the Counties, and eighty-six from Upper Canada from thirty-six counties. Seven Lower Canada and three Upper Canada returns report that no winter wheat or very little is grown.

The average growth of the thirty-six winter wheat growing counties is only twelve bushels. That of forty-six spring wheat growing counties is 13½ bushels per acre.

Taking the average of winter wheat at 18 bushels per acre, the deficiency of this year's crop will be 33 1-3rd per cent.; and taking the average of spring wheat 16 bushels per acre, the deficiency will be about 15 per cent.

The acreable extent of winter wheat is probably one-third greater than that of spring wheat, but this year's experience will diminish the extent of winter wheat and extend that of spring wheat, particularly that of the species called "Fife" or Glasgow wheat, which nearly all the returns represent as entirely free from rust, and very nearly free from midge, and especially so when sown in April or after the 24th of May, either very early or very late.

The winter wheat called Mediterranean is also stated by four parties to be entirely free from rust or midge, and this is corroborated by several writers in the *Country Gentleman* and other New York papers.

The opinion as to its quality in other respects varies very materially. It is not universally recommended, but has some warm advocates as a prolific wheat. Had the Fife wheat been universally sown the crops of spring wheat would have been a full average.

When it is considered that winter wheat on summer fallows requires the occupation of the land two years and spring wheat only one, the farmer will probably endeavor to adapt his system to the cultivation of spring wheat, where naked summer fallow can be dispensed with, and this year's experience is very much in favor of spring wheat.

The breadth of winter wheat already sown, is much diminished, but what is growing has been generally sown very early, and has a most flourishing and luxuriant appearance.

Three counties of Lower Canada, Two Mountains, Argenteuil and Pontiac have reported the successful growth of winter wheat—two having reported 20 bushels per acre and the other (Argenteuil) 16. The Counties in Upper Canada which have reported freedom from the midge are Stormont, Carleton, Grenville, Lanark, Russell, Renfrew, North Simcoe, Grey and Bruce. The new townships of Addington and North Hastings, Peterborough and Victoria are also free.

Stormont returns 30 bushels per acre, Carleton 28, Russell 27, Renfrew 22, Simcoe 21.

The insect does not appear to have reached the cultivated lands in the north, although it has reached the extreme west, having travelled regularly from the east. It is to be hoped that it has left the eastern townships of Upper Canada. It is still to be found in every county along the lake shore, from Frontenac west to Essex, Lambton and Huron. The farmers to the north will probably have it next season, and they and all others should provide against its ravages, by sowing very early and having their land well drained and cultivated, so as to encourage early muturity, in order that the vegetable life may have the start of the animal life; or else, if need be, very late, so that the wheat may not blossom till the midge shall have assumed the grub state, say after the 24th of June.

To avoid rust, which has this year been nearly as destructive as the midge, the Fife or Glasgow spring wheat should be sown. About 60 of the returns state that no rust affected this sort of wheat, and no returns state that it did.

With regard to other crops, rye, barley, oats and peas appear to be full average crops, with very few exceptions. About ten report failure of the oat crop from rust and wet, and partial failure of the rye crop from the midge, which they assert has attacked that crop, and in some cases barley as well as the wheat, and the cause of rust is universally attributed to be want of proper drainage and of free circulation of air. Two returns from Essex, two from Kent, two from Frontenac, two from Middlesex, one from Northumberland, and one from Elgin report almost a total failure in the oat crop, in all cases attributed to rust. With these exceptions, the crop is reported nearly an average of about 30 bushels per acre.

With regard to Potatoes, the returns are by no means favorable as to quantity, although very much so as to quality. Almost all report a deficient crop from various causes. Twenty-nine attribute the deficiency to drought or to wet weather at the time of planting; seventeen to the common rot; forty-two state distinctly that there is no rot, and twelve have made no report. In parts of Northumberland, Durham, York, and Leeds the Grasshopper has done very serious injury to the Potato crop, as well as to Clover, Wheat, &c. The general average given in the returns is 112 bushels per acre. Taking the average at 150 bushels, of 56 lbs., the crop is about 33 1-3rd per cent. deficient in quantity, but the excellence of the quality will in some degree com-

pensate for that. In the new townships, on the Free Grant Roads, it is well worthy of remark that the rot has not affected the potatoes in the slightest degree, and the crop is generally excellent both in quantity and quality. The grain crops also in these localities bear the same character for excellence.

The inferences I would draw from these hundred returns are

1st. That the whole wheat crop of Canada for 1848, including both winter and spring wheat is about 25 per cent. below the general yearly average, allowing for the good quality of the spring wheat and winter wheat which have escaped the midge, and rust, the samples of both being excellent.

2d. That the crops of rye, barley and oats are about a fair average, notwithstanding the partial failure of the last named.

3d. That the pea crop is a little beyond the average, say ten per cent.

4th. That the potato crop is about 25 per cent. deficient, allowing for the excellent quality, which is above par.

5th. That the Indian corn crop has been much less cultivated than usual, owing to the planting season being extremely wet, and that there will be a very small surplus of this grain beyond what will be required for domestic purposes, forty-seven returns having reported that there is little or none grown this season.

If these deductions are correct there is a slight improvement upon last year's crop of wheat, which was 31 per cent. short of the general yearly average, this year's deficiency being calculated at 25 per cent. The potato crop also is better than that of last year, which is an item of considerable importance in the year's supply of food.

I am, Sir,
Your obedient servant,

WILLIAM HUTTON,
Secretary.

ARE CLEARED LANDS MORE SUBJECT TO DROUTH THAN OTHERS?

The writer has often read in articles which have appeared in the agricultural papers touching the bad effects of cutting away our native forests, that where so cut away, the land becomes more subject to drouth than before. We fancy such theory can only apply to the fact that clearing away the forests and opening the land to cultivation, gives a freer passage to the water, as it falls or collects in various bodies, as swales, swamps, springs, &c., and passes it off into the larger channels; for we do not see how the simple fact that trees, averaging not over eighty feet heigh, can attract larger bodies of water through the clouds thousands of feet above them, than the surface of the earth could do without trees. The face of the country has much more to do with it. Hilly and mountaneous countries in the temperate zones, are usually more showery than plains; and whether the hills be bare or forrested, appears to make no difference. The natural laws of atmosphere, climate, evaporation, winds, and the locality of bodies of water, we imagine to be controlling causes in the falling of rains, or the occurrence of drouths.

We are led to these observations by the immense rains of the present season, which have fallen all over our Western States, almost with the violence and continuance of a deluge, and the vast prairies, stretching for thousands of miles in extent, seem to have had, if anything, the worst of it. There are no mountains there—the Alleghanies being the most Western range, east of the Mississippi—and none more for a thousand miles beyond it. Nor is the country even hilly; but one immense champain of level and rolling timber and prairie faring about alike in each and every year with rain or drouth.

We have a good many weather wise-acres in the land, and many meteorological tables have been kept; but we confess with all our investigations, we have as yet been unable to work out any conclusive problem to guide or regulate our judgment in atmospheric phenomena, other than the barometer and thermometer; the one giving us only a day or two's indication of what weather may come, and the other telling the fact as it is at the moment.

There is no sort of regularity, year by year, to our American climate, except in the revolution of the seasons.—*American Agriculturist.*

ADDRESS,

DELIVERED BY DR. LAWSON, AT THE AGRICULTURAL SHOW AT KINGSTON, ON THURSDAY, 28TH OCTOBER, IN THE CRYSTAL PALACE.

[We have much pleasure in laying before our readers Professor Lawson's admirable address, which they will peruse both with pleasure and profit. Dr. Lawson is an important acquisition not only to the University of Queen's College, but to the Province generally. We shall be happy to hear again from him on agricultural matters. The Exhibition was eminently successful, and reflected great credit on the agricultural societies of the County of Frontenac and the City of Kingston.—ED. AGRICULTURIST.]

Presidents, Ladies and Gentlemen,—I have been requested by the Directors of this Society to take a part in the day's proceedings. I am not a farmer. I am scarcely yet a Canadian. I have therefore no special claim on your attention, no intimate acquaintance with your art, no personal experience of the capabilities of your soil. But I cheerfully comply with the request that has been made; for, although I have nothing special to communicate, I feel that it is the duty of every one to aid, to the extent of his power, however humble that may be, to forward the important objects of such an Institution as this. One great use of Exhibitions like this is to bring science and practice more closely together; and in proceeding to discharge the duty which has been assigned to me, I do not know that I can (in the present stage of Canadian farming) occupy your attention more profitably than by briefly pointing out some of the results of science which bear upon rural improvement.

In the admirable address delivered by Mr. Ferguson at the late annual meeting of the Provincial Association at Toronto, we were told of the gigantic strides which this country had made within the memory of the present generation; how the old fashioned one-handled plough with wooden mould boards, and other implements equally rude, which were in common use, have vanished away before the improvements of our own time; and how, in all that relates to mechanical appliances, Canada is following closely at the heels of the most advanced nations of Europe. And especially pleasing is it to observe at these Exhibitions that the workshops of Canada are striving not merely to emulate the manufactures of Europe, but seek rather to provide our farmers here with implements and machinery better adapted than English models for Canadian work. In like manner, how marvellous the improvements that have been accomplished in our means of transit, both by land and water, over the slow, expensive, and insecure methods which alone were available not very long ago. And when, in addition to all these benefits, the farmer has all the results of modern science placed before him to guide his hand, and foster a spirit of improvement—is it not reasonable to expect that he shall not lag in the race, but shall make efforts greater than any that has yet been made to raise his art to the common platform of modern progress?

The genuine interest displayed in the promotion of agriculture in this Province, shows that the farmers are not indisposed to respond to the call that has been made upon them. When I see before me an assembly of Canadian farmers, and think of the past history of this great country, in which they have been playing so important a part; when I think of the results that have already been achieved, of the wide forests that have melted away before the strong arm of the woodman, like the morning mists before the rising sun; of the broad expanse of pasturelands and cornfields that are now spread before us, at once an earnest of the dominion of man and of the success of his labors; when I think of the noble institutions that we meet with on all hands in Canada, evidences of the rapid strides she is making in the march of civilization; when I think of these, and of triumphs of labor and thought such as these, which on Canadian soil meet us on every side; I say, when I think of these, a bright vision of progress and prosperity for the future rises before me. The noble forests that had for countless ages grown in all the wildness of nature presented a bold front, sufficient indeed to stem the tide of ordinary civilization. Like a strong enemy they would have scorned a puny hand. They called for great energy and perseverance. Great energy and perseverance were brought to bear upon them, and they began to fall; soon the sombre forest was lighted up by the tin-covered cupolas and church spires, which, glistening in the sunshine, shed their radiance around, indicating from afar the villages and cities which were to form the centres of future civilization. The same spirit of activity and deter-

mination which has made so glorious a victory in the past, is now actively at work among you—the Exhibition this day is one of the many evidences of it—and herein do we see the elements of Canada's future greatness. Where so much good work has already been done, we may reasonably hope that much good work will still be done. The hand that cleared away the forest has not lost its cunning. In this Society you have an important instrument for good. It is to Societies like this that Agriculture owes its advancement in Europe. The Royal Agricultural Society of England and the Highland Society of Scotland have for many years kept before agriculturists the importance of improvement and the means by which it was to be accomplished; they have directed the researches of scientific men on the one hand, and the experimental practices of the farmer on the other; and now we have in many parts of Britain an amount of success in farming which its most sanguine promoters could not have anticipated. But these leading Societies have not done *all* the good work. Valuable results have from time to time been obtained by farmers, and proprietors, and chemists, working apart and in seclusion. But it is to the County Societies in the old country—to Societies such as this, limited in their operations to a certain district—that we are to attribute much, very much, of the good that has been done, and of the genuine interest that has been awakened in improved cultivation. The discussions at *some* of these County Societies no doubt reach you through the press; but many more are actively at work unknown beyond their own circle, surely and unostentatiously evolving good fruits, year by year solving more and more fully the problem of increased production, of growing two blades of grass where only one grew before, a problem which acquires a new phase through every new discovery.

This Society has a noble work before it, and I trust that it will meet with that support which it deserves—the support of farmers and proprietors and amateur agriculturists on the one hand, and of the general public on the other. The cultivation of the soil is not a subject which affects only that class of persons who are actually engaged in its operations. On the contrary it forms the first stratum of civilization; more extensive than all others, it is the one upon which they all depend, the one upon which all our institutions are built up; it is the originator and the supporter of all the other arts of peace.

"The profit of the Earth is for all; the King himself is served by the field."

In all time, the farmer has been honored above all men, and the cultivation of the soil is held in all civilized nations to be the most honorable employment of man. Even the imperious senators and warriors of ancient Rome, amid all the excitement and glory of successful war, sought, in the culture of their lands, relaxtion from the dangers of the battle field, or the cares of the state; and according to a writer of that age, "the Earth delighted to be ploughed with a share adorned by laurels, and by a ploughman who had been honored with a triumph." And in our own day, the glory of our arms has not diminished the lustre of the ploughshare.

In England our noblemen and our merchant princes are now exchanging the turf for the cornfield, which they find as pleasant and as profitable; and while I am speaking to a people so loyal as the Canadians, can I omit to remind you that our Queen Victoria's husband—the Prince Consort—is an Aberdeenshire farmer, and grows very good turnips indeed.

When the hero of Kars set foot on Canadian soil, who was it that gave him a first welcome? who but the farmers of Hamilton. They showed their appreciation of the gallant soldier, and the soldier showed his appreciation of their peaceful pursuits. It requires a *strong* mind to make a man in war; it requires a *good* mind to make him great in peace; and when Sir William Fenwick Williams of Kars gave expression to his hopes and prayers that this country might go on prospering, that it might realize the hopes of its sons and of the British Empire, and that even in our day its vast wildernesses might be converted into smiling fields—he showed his claims to a new laurel which his Canadian friends know how to honor: one they will not soon let wither.

The good results brought about by this Society are visible in the improvements which we see around us on the farms of the district over which its influence extends; and their products are brought before you this day in forms which evidence more fully the good that has been accomplished. Let it then go on and prosper in its good work; let it be widely known that the Society expects every member to do his duty; and let every member, and every one connected with this Society, rejoice that he has it in his power to do something for the common good. And having done our part, let us seek the Divine blessing on our labors; let us remember that while Paul may plant and Apollos may water, it is God that giveth the increase.

What is the annual course of operations on a farm? In spring time the farmer ploughs his land, drops his seed, covers it up, and forthwith the young crop arises; day by day it increases in stature, and in autumn it realizes his just hopes by a golden harvest. Here is a mystery that may well arrest our attention. The seed grain, with its germ of life, has grown up into a living being, and it yields seed after its kind. Let us see how its growth is accomplished.

The first statement I wish to make is that plants are living beings like ourselves. I might illustrate this by pointing, as the physiologists of olden times did, to some remarkable instances of irritability and movements exhibited by certain plants, such as the moving plant of India, the sensitive plant, and many others. But I do not found my statement that plants are living beings upon the evidence afforded by such exceptional examples as these. We have far more satisfactory evidence in the minute structure of these plants, which, in its essential character, closely resembles that of animal bodies.

[Here the minute structure and cellular development of plants, and the chemical changes that take place in their tissues, were explained.]

Now, what are the sources of the plant's food which enable it to perform the phenomena of growth? which enable it to increase in size, and furnish food for man and beast? We find that all the elements of which the plant is composed are found in the inorganic world. It therefore creates nothing. When we partially burn a plant (or a piece of wood) we drive off water and other volatile matters and leave a black mass of charcoal, or *carbon;* if this carbon is burned in the air it disappears, leaving the ash behind, which does not volatilise. This is mineral inorganic matter, which, along with water, has been derived entirely from the soil; the carbon is derived from the atmosphere which the plant breathes.

[Here absorption and the mode of feeding in the plant were explained, and the stomata were described by which it abstracts from the carbonic acid of the atmosphere the carbon of which its tissues are in great part built up.]

We see then that plants are endowed with life, and exercise all the functions belonging to organized beings. Like animals they feed and breathe, and in our cultivation of them we must see that their wants are ministered to. But all plants are not alike in their choice of conditions of growth: some grow in the sea; some grow in hot water; some grow in cold fresh water; some grow on snow; some grow in wet soils; some grow in dry ground; some grow in arid sands; some grow on decaying matter; some grow on other plants, as parasites. All this teaches us that we must imitate the conditions necessary for the plant we cultivate. The atmosphere, which forms one source of the food of plants, is, to a great extent, beyond man's control, but not so the soil. It is in many respects capable of improvement.

[Here the chemical characters of soils were referred to in detail, and also their mechanical conditions.]

One of the most frequent difficulties with which the farmer has to deal is a superabundance of moisture. There are various ways of remedying this, but a few general principles are applicable to all. [These were explained.]

In regard to ordinary drainage there are many points that can only be considered fully on the spot. Much discussion has taken place as to the direction, and especially the depth, of drains. It seems to be well established that on light soils drains act more effectively the deeper they are placed; but it is necessarily very different on clays where the water cannot percolate. In such soils, while the actual depth must depend upon the depth of available soil, and other circumstances, it must never be carried too far, otherwise the clay will resist the passage of the water, and thus the drains will remain useless.

It is also a question of frequent discussion in England: what is the proper distance apart for drains? And here it is necessary to take into account the differences in regard to capillary attraction of soils, or that power by which they are enabled to suck up water from below.

[Here the effects of different modes of drainage were explained by diagrams.]

In a comparatively short time draining has completely changed the aspect of extensive tracts of country in Britain, converting the cold morass into fertile fields and greatly increasing the annual produce, even on soil which was before bearing crops sufficient to satisfy the most exacting expectations. One reason, I believe, why so little has been done in the way of draining in this country is that drain-tiles are expensive, and not readily attainable. The same objection existed in Britain not very many years ago; but the demand for the article soon led to its increased production, and

now our farmers in most parts of Scotland and England have no difficulty in obtaining drainage materials. There is no good reason why the same thing should not result here. There are ample deposits of clay in many parts of Canada well adapted for brick and tile-work. There are deposits in the immediate neighborhood of Kingston which may no doubt be worked to advantage, and which, in the nature of things, cannot possibly be idle after a permanent demand for drain tiles is established.

By growing in rich soil and supplying all the conditions necessary for luxuriant growth, many plants which in their wild state are unfit for any useful purpose, have been rendered subservient to the wants of man.

[Here the origin of many of our cultivated crops, such as wheat, turnips, cabbages, &c., was explained.]

When we think of such improvements in the common plants we rear, it affords much encouragement to those who would direct their efforts in this direction, with a view to the raising of new varieties. And here I would observe that much remains to be done in this way in Canada. We Scotchmen, and Englishmen and Irishmen, are prone to imitate the British institutions and British practices. Many of these have been introduced and have proved of great value, but some have been found unsuitable to the conditions of Canada.

In the choice of varieties of the leading crops in the kinds of wheat, and of barley, and of oats, and of turnips, the Canadian farmer has hitherto depended chiefly upon varieties obtained from Britain. But the climatal conditions of Britain are so different from those of Canada, that it is impossible to believe that the varieties best adapted to the former are likely to be the most useful to the latter.

The raising of new varieties better suited to the climate than those now in existence, is surely a matter of no small importance to Canadian agriculture, and I earnestly trust that it may receive the attention which it so well deserves. It is a slow process, however, and the farmer who undertakes it, must

"Learn to labor and to wait."

But I may naturally put the question, Have you already ascertained with any degree of accuracy that old varieties of wheat and of barley, of oats and of potatoes, of turnips and of other forage and pasture plants, are adapted to the circumstances of Canada? No doubt much useful information has been elicited. It is impossible for so many active farmers to have lived in Canada, stirring the soil from year to year, and watching the growth of the crops, without acquiring much experience on this point. Still, when I think of the many varieties known in Europe adapted to every kind of soil and situation, it is impossible to believe that there is not still room for well directed experimental inquiry on this subject in Canada.

It is now well known that the choice of suitable varieties is even more important than the choice of good soil, or the application of manure; for our scientific agriculturists no longer regard the plant as a mere machine acting a mechanical part, and guided by certain chemical changes. It is a far more subtle thing; it is guided in its development by the laws of life, which overrule all chemical action: thus chemistry is no longer the solitary guiding star of the scientific farmer. Physiology must go with it, hand in hand, in all that relates to improved cultivation.

When improved varieties are once obtained, high cultivation is necessary for the continuance of those properties that render them valuable.

When cultivated plants are neglected and allowed to grow in a poor soil, they soon revert to their wild condition. It therefore requires a continuance of suitable conditions to perpetuate those peculiarities which render them useful to man. In the *first* place, the soil must contain in sufficient abundance those elements required for building up the plant's structure. If they are not present naturally, they must be supplied in the form of manure, which may be of various kinds, according to the circumstances of the case. As Sprengel observes, "a soil is often neither too heavy nor too light, neither too wet nor too dry, neither too cold nor too warm, neither too fine nor too coarse; lies neither too high nor too low, is situated in a propitious climate, is found to consist of a well proportioned mixture of clayey and sandy particles, contains an average quantity of vegetable matter, and has the benefit of a warm aspect and favoring slope;" but although possessed of all these advantages, it is yet unproductive, because it wants some mineral constituent required for plant food.

The soil may be naturally unfertile, or originally fertile; it may have become barren through long cultivation. In a new country there is a strong tendency to carry off

annual crops from the land without giving anything back. We have seen that the plant cannot create anything, neither can matter grow in the soil; if we wish to retain its fertility, we must replace what we have taken away.

As regards manures of a general nature designed not so much to supply any special want of a soil whose barrenness arises from some such idiosyncracy, as that to which I have alluded, but to increase the general fertility of the land—long experience has shown that vegetable and animal matters are by far the most useful, and generally applicable; and by them we are enabled to restore to the soil precisely those substances that have been carried off from it by our farm crops; for different species have diverse preferences and capacities in this respect.

Let me urge you therefore to value such materials and not let them run to waste. It is by means of these that your soil may be enriched, your exhausted soil redeemed, and your annual produce increased. When you see a bone lying by the wayside, (and in this part of the world you cannot go far without seeing one), do not pass it by, do not despise it. Pick it up and throw it into your cart, for therein are the elements out of which your art makes a loaf of bread. Think of the care with which every grain of bone dust is gathered up like gold, in England; think of the crops which it realizes; of the ample fortunes which the very gathering of bones there have realized; and think of the turnip fly, which bone dust cheats out of its favorite morsel!

How much of the success of farming and of all other arts and manufactures depends upon the saving of material! upon imitating that beautiful law which chemistry teaches us, that in nature nothing is lost. In Edinburgh we have a distillery of great extent, where economy of heat and material is wonderfully carried out. The "dreg," a waste product, was produced in such quantities that all the cows in Edinburgh could not consume it, and there remained an enormous surplus which had to be discharged into the water of Leith. This nuisance the modern Athenians protested against as an outrage on their sweet smelling city. Something had to be done. Seed cake had been used by farmers, and it occurred to the proprietors that the "dreg," as well as oil refuse, might be pressed into a cake. Machinery was accordingly fitted up, dreg cake was prepared, and in going through the premises a few days before I left Scotland, I found that the proprietors were realizing £60 a week from this waste product, which, although so much despised in Edinburgh, is now sent to the farmers in all parts of Scotland, to be returned in the form of fat cattle and butter and cheese. With all your improvements and assiduity in cultivation, there is still a cankerworm to give you care. Even after you have drained and ploughed, and subsoil ploughed and manured, and sowed good seed, and tended with care, yet will thieves break through and steal, in form of *wheat flies*, which all the Acts of the Legislature, and all the Dicksons in Canada, cannot reform; turnip beetles which, tiny as they are, seem to eat up whole fields of young turnips at a mouthful; and other pests of the insect world, with which you are no doubt all too familiar. No, not *too* familiar, for their doings are only in part known; if their habits and their history were better known, we should, no doubt, be better able to cope with the evils which they bring.

But there is also in Canada, I am sorry to say, as in other parts of the world, another host in arms interrupting the peaceful tenor of the farmer's way. These are of vegetable origin—the mildews and moulds and blights and rusts and smuts, which you all know by experience, and which are interesting to the scientific observer from their inscrutable ways and the masks they so often put on to elude his prying eye;—at one time adopting one form of development, and anon changing the whole tenor of their life; at one time attacking a living plant, at another time living on decayed matter; the same species in one form spreading a film of mould on the contents of a long cherished pot of preserves, and in another form playing the alchemist in the cupboard, and transforming molasses into the best brown vinegar. And these, and such as these, are they all the enemies with which the farmer has to contend? They are sufficient indeed, but let us remember the weeds that are so abundant in many fields, that reap from the soil so much of its riches, and so frequently smother the growing crop.

One would imagine that in Canada, where so much trouble and labor have been expended in clearing the soil from its indigenous arboreous vegetation, that when once cleared it would be kept clean. But no sooner are the trees hewn down and the soil turned up, than the herbaceous weeds assert their place and power, and often defy the efforts that are made to keep them in check. These efforts must be increased. When you see a broad patch of crowfoot in your field, or a bed of thistles in your pasture, reflect that the ground they occupy is yielding no return, that it might as well not have

been cleared at all. In your march forward into the woods forget not that the enemy comes in behind; and forget not that it is less honorable to make the conquest of new territory than it is to hold and defend that which has been already won.

It is not alone the loss of the soil and necessarily increased expense of cultivation that field weeds involve. One thing is certain, that no better means can be devised for the encouragement of insects. In regard to the turnip fly, for example, it is well known that it feeds only upon plants belonging to the same natural order as the turnip. In early spring and summer time weeds belonging to this order are often abundant and form suitable pasturage, where the turnip flies congregate and increase to an amazing extent, so that when the young turnip crop appears they at once migrate to its more delicate leaf and blast the hopes of the farmer. Just before leaving Scotland this summer a remarkable instance occurred to me, illustrating what I have said. Two fields, in the same district, and both of clayey soil, were cropped with the same kind of turnips of apparently the same age. One field was isolated by corn fields and potatoes, and I could not detect in it a single fly. The other field was also isolated, but was in a perfect swarm. The reason was explained when I found in one corner of the field an extensive rubbish heap covered with wild mustard, which had been growing since the previous autumn, and thus had formed a winter's provision for the fly.

Another great evil resulting from the abundance of weeds is this, that their seeds become mixed with the grain, and thus we have a dirty sample. This deteriorates from the market value of the grain. At Toronto I saw a very ingenious machine designed for the purpose of cleaning dirty grain of this kind, and I must say it did its work well; but it would indicate a far more hopeful appreciation of the value of clean grain if we were to begin at the beginning, and not allow the weeds to ripen in our corn fields at all.

There is one branch of rural economy, so closely connected with agriculture, that it may without impropriety be noticed on an occasion of this kind. We know that the effect of colonization and civilization in all parts of the world has been to denude fertile land of its native forests. Throughout middle and southern Europe we only find here and there the remnants of the original arboreous vegetation. "Clearing" is in fact necessary to permit the industrial operations of man. But the clearance of forests is not an unmixed good. On the contrary, we find that a train of evils sometimes follows it, which all the exertions of man cannot repair. While there is a want of precise information as to the physical effects of the removal of forests, we have sufficient information to show that such operations should not be carried out indiscriminately, and trusted entirely to private interest, but should be regulated for the general good, and with a view to the permanent interests of a country. The researches of my friend, Professor Cleghorn, at Madras, have shown how injurious have been the neglect of needful precautions in the felling of timber in many parts of our Indian Empire. Humboldt tells us that "by felling trees which cover the tops and sides of mountains, men in every climate prepare at once two calamities for future generations—the want of fuel and the scarcity of water. Plants exhale fluid from their leaves, in the first place for their own benefit. But various important secondary effects follow from this process. One of these is maintaining a suitable portion of humidity in the air. Not only do they attract and condense the moisture suspended in the air and borne by the winds over the earth's surface, which, falling from their leaves, keeps the ground below moist and cool; but they can, by means of their roots, pump it up from a very considerable depth, and, raising it into the atmosphere, diffuse it over the face of the country. Trees, by the transpiration from their leaves, surround themselves with an atmosphere constantly cold and moist. They also shelter the soil from the direct action of the sun, and thus prevent evaporation of the water furnished by rains." Thus do the forests contribute to the copiousness of streams, and preserve during the hot season a certain amount of moisture in the atmosphere. But it is not on such grounds alone that I would argue the conservation of forests in Canada. Let us look to the position of other countries at the present time where timber is scarce, and contemplate the advantages that Canada enjoys at this moment in its glorious old woods, the source of half its riches. Let us reflect on the means that have gradually rendered other countries so poor in this respect, while we are so rich. And while we enjoy the riches, let us see that they are secured also for our successors; that in rendering Canada an agricultural country, we do not forget to provide for the permanent maintenance of those vast supplies of timber which are found so valuable in all the arts of life, and so necessary for the very existence of a people so ill provided with fossil fuel.

In various European states, and in Britain, great efforts are being made to improve

the management of forests, and much good has been done. One curious result brought out by the Scottish Arboricultural Society is this, and it may stagger the Canadian farmer, that while forests have through neglect been ruinous to many proprietors in Britain, still, when properly cared for by yearly pruning and thinning, they not only repay all the labor bestowed upon them, but yield, on good soils, as profiable a return as wheat or green crops.

Now, I do not expect that we can secure for many years to come the same amount of labor for the rearing of natural or artificial forests as is now bestowed in many parts of Scotland and England; but I do not see how this branch of industry should be neglected—how, for example, our Canadian forests, especially in the neighborhood of towns, should not be pruned and thinned, so as to secure a full and regular crop of good timber, instead of the trees being allowed to grow indiscriminately, forming a tangled wilderness, where the good trees, choked by useless undergrowth, scarcely afford a reward for the labor of felling. There is also to be found in Canada land not adapted for heavy corn crops, but admirably adapted for timber, which would undoubtedly yield a profitable return if planted with suitable trees.

These suggestions I offer as the first thoughts of a stranger on looking abroad upon the country. They may appear ill-adapted to the wants of the country at the present time. It may seem that I have formed an erroneous appreciation of Canada when I recommend the growing of timber, as well as the growing of corn. But both are necessary for the successful development and permanent success of a country like this. While in the midst of abundance we are apt to neglect provision for the future in regard to a crop like timber which requires half-a-life time for its development. But assuredly, if we do not anticipate and provide, the time will come when many districts of Canada, like all other civilized countries, will feel the want; year by year, as the agricultural resources of Canada are more fully developed, the natural supplies of timber will decrease. Need I further allude to the effective means of decorating our cities, which are so fully afforded by our native trees. In Kingston a custom prevails to some extent of lining the streets with trees, to overshadow the passer-by. In oriental countries it is a public duty. In Kingston I trust the taste will extend. But trees are not appreciated here as they are even in Britain. I know that if such natural avenues of gigantic cedars as you have not far from this city were found within the length and breath of Scotland, they would be all grubbed up by McGlashen's transplanters in the course of a week, and transferred to the pleasure grounds of Edinburgh Advocates. Why should we not have some of them in Kingston, that, in the oriental language of Emperor Akbar, "their sweet odors may reach every one, and that from those luxuries a voice may go forth to travellers calling them to rest in the cities where their every want will be supplied."

I have thus thrown out a few hints that may suggest inquiry or discussion or contradiction. It will be strange if I have talked so long without dropping some thought that may take root in some one's mind. One thing is certain, that I have not been sowing on a stony soil; and if perchance one seed shall grow up and bear goodly fruit, I shall know that it was not *all* chaff.

The lecture was illustrated throughout by reference to drawings, &c.

ABSORBENT POWER OF SOIL.

Absorption, defined by Webster as "the act or process of imbibing by substances which drink in and retain liquids," is a quality possessed by all soils in a greater or less degree. And of this difference in capacity, especially as regards absorbing and retaining manures, something has long been known, and has given rise to the application of the terms "hungry" and "quick," to loose and gravelly soils, because they do not long show the effect, and speedily manifest the action of manures, while clays are said to "hold" the fertilizing matters applied. The investigations of chemistry show that besides what would naturally result from the different mechanical action—the compactness or porosity of the soil—there are differences in their chemical affinities for acids, alkalies and gasses, which vary their powers of absorbing and retaining the elements of fertility derived from manures.

Loam and aluminous soils were found by Prof. Way to possess the power, when used as a leach or filter, of retaining the ammonia, phosphoric acid, potash, etc., contained in the drainage of a London sewer—the very elements most valuable for manure—and to

have the wonderful property, not only to select, but to retain these elements against every power naturally brought to bear upon them, save the growth of plants themselves. "A power," he remarks, "is here found to reside in soils, by virtue of which not only is rain unable to wash out of them those soluble ingredients forming a necessary condition of vegetation, but even these compounds, when introduced artificially by manures, are laid hold of and fixed in the soil to the absolute preclusion of any loss, either by rain or evaporation."

These conclusions seem to show that on most soils (one class of experiments was made with light loam) manure may be applied at any time in the season with equal good results—that there is no danger of loss when actually mixed with the soil, either by filtration or evaporation. Further experiments are needed to prove the absolute correctness of these conclusions to the general mind, but there are these who believe they may act upon them with safety. If established, much labor may be saved in the application of manures. They may be drawn in the fall and ploughed under, or left spread upon the surface, or may be distributed in winter, instead of immediately before planting and sowing, which is ever the most hurrying season of the year. For ourselves, on clays or heavy lands, we would not hesitate to act upon these suggestions.

Some experiments tried in England several years since by Mr. Thompson, to ascertain the power of the soil to retain unimpaired in value manure applied during winter, and also its power to hold in suspension the fixed ammonia of barn yard tanks and manure heaps, resulted in the following deductions:—1. That clay soils might be manured a considerable time before sowing without loss. 2. That light, shallow soils should not be manured heavily at one time; and the manure should be kept as near the surface as possible without leaving it uncovered. 3. That it is desirable to deepen the cultivated soil on all light lands, as it thus gives it a greater power of retaining manure.

That all soils possess considerable power of absorbing and retaining manure, is well known; but the great question of the most economical application of different fertilizers is, and will long remain an open one, and one upon which every farmer can do more or less to satisfy himself by practical experiment. Let those who can, throw light upon the subject, for it is one of large importance in agriculture.—*The Country Gentleman.*

IMPROVEMENT OF PASTURES.

As the subject of the grasses and its importance has been frequently treated of in many of the agricultural journals, a recurrence to it at any time it is hoped will lead the agriculturist to study his best interest. Our pasture grounds need greater attention than is generally paid them, to make them productive in quantity and quality, of the grasses for the grazing herd. Next to having good stock, is that of providing good pasturing. All lands are not adapted to this purpose. There is a vast difference in the quality of the grasses, and we consequently find that in some pastures in which there is a luxurient and well sustained crop of herbage the season through, the animals are famished and lean that are fed upon them. Other lands devoted to their use, while they appear short and dry, turn out their tenants in the fall in a condition obviously improved—they are fat, sleek, and show no signs of a lack of food, but the reverse. Low lands, which are generally saturated with water which becomes stagnant, seldom produce any but aquatic grasses, and can never be rendered good for pasture without draining. Although they produce an abundance of green, and apparently succulent herbage, the animals are invariably poor, afford but little milk, and come to the barn in autumn lean and enfeebled. High grounds, although they are more liable to be seriously affected by drouth, have the advantage of producing a more nutritious quality of food; the grasses are short, sweet, and highly nutritive, and animals pastured upon them gain rapidly in flesh, and produce not only a larger quantity of milk, but that of a superior quality. Yet the best pasture lands, like the grass and cultivated soils in general, will nevertheless in time become sterile; the more valuable kinds of grass will "run out," and be supplanted by others of a less desirable kind or entirely worthless class. Nature, in this, seems to corroborate the importance of a rotary system of cultivation, with respect to all the more valuable productions. After producing a certain class of plants, for a stated or definite period, the soil appears to weary of it and de-

mand a change. We see in our forests, that the oak succeeds the pine and the pine the oak. So the minor productions. Corn cannot be cultivated with success on the same soil more than three years in succession at most. Wheat never succeeds more than two, and clover and the other cultivated grasses deteriorate after yielding a few crops, and finally depreciate and disappear. By breaking up our pasture grounds, occasionally, applying manures and plaster, and stocking down with fresh seeds, we should find that the soil would be vastly benefitted and improved.

Where the surface is such as not to favour this kind of ameioration, the use of plaster, ashes, lime and other similar fertilizers, is of great benefit. I have seen poudrette, guano, bone-dust, &c., used with good success, especially on sandy soils for pasture. But as to guano, I cannot recommend it for this purpose, at the present high price.

My plan for the last named soil, is to turn under a good crop of grass in August or September, and sow half a bushel of timothy, and red and white clover equally mixed, and apply three bushels of plaster to the acre as early as the first to the tenth of September, and keep off the cattle until the middle of the ensuing May; this is all that will be needed for several years, until the grass plants begin to fail, then they may be manured with good barn-yard manure as a top-dressing in the fall, and sow three or four bushels of plaster in the spring, and you will find the results all that is desirable.

Another thing very desirable and important to having good pastures, is to know the quality of the soil, and its chemical constituents, and then the kind of grass that will produce the most nutrition to the animals to be fed, whether for milk or flesh; for the great fundamental doctrine from whence all our reasoning on the subject of animal nutrition, is the identity or almost identity, of the principle of vegetable and animal body. The conclusion founded upon this identity is, that with slight modifications, the vegetable principles are assimilated by the animal frame—the albuminous being converted into flesh and muscle, the oily ingredients into fat, and the mineral salts into bone and other solid parts. In the dairy, next to a good cow, is the importance of good food to the production of a good article of butter or cheese. Many dairymen are disappointed in not having a good article, and frequently lay the blame on the dairymaid, when the real truth is, the fault is in not providing good feed and pure water for the cows.—*Country Gentleman.*

A COUNTRY HOME.

Oh! give me a home in the country wide,
And a seat by the farmer's wood fire-side,
Where the fire burns bright,
On a frosty night,
Where the jest, the song, and the laugh are free,
Oh! the farmer's home is the home for me.

Oh! give me a home in the country wide,
When the earth comes out as a blushing bride,
When her buds and flowers,
In the bright spring hours,
Her bridal song ringing from fresh leaved trees,
And Melody floats on the perfumed breeze.

In summer a seat in a shady nook,
And close by the side of a purling brook,
Where the violet grows,
Or the pale swamp rose,
Fainting, sick, 'neath the sun's scorching beam,
Dips her pale petals in the cooling stream.

Oh! give me a home in the country wide,
In the golden days of a farmer's pride,
When his barns are filled,
From the fields he's tilled,
And he feels that his yearly task is done,
And smiling at winter, he beckons him on.

THE

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AND

JOURNAL OF THE BOARD OF AGRICULURE

OF UPPER CANADA.

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WINTER MANAGEMENT OF STOCK.

THERE is, perhaps, no part of what is designated the mixed system of husbandry of greater importance than the breeding and proper treatment of live stock. Cattle and grain most beneficially act and react upon each other. The domesticated animals of the farm, in addition to their current market value either for the breeder or the butcher, may be regarded as living machines for the elaboration of the most valuable kinds of manure for promoting the growth and maturity of the cereals and root crops; the latter of which now occupy so prominent a place in all the improved systems of modern agriculture.

Much attention has been paid of late years in Canada to the improvement of the breeds of cattle, sheep, and swine, and several enterprising individuals in different sections of the Province, have incurred very heavy outlays in importing from the United Kingdom and the neighboring States excellent specimens of the most approved modern breeds. This preliminary step necessarily involves both a heavy expense and considerable risk; and it cannot be too often insisted on that a very large portion of the benefit of such importations and subsequent improvements in breeding, must essentially depend upon the *after treatment* of cattle. The obtaining of superior animals is most unquestionably an important and expensive step; but it should be borne in mind that it is after all only *preliminary*, and that success and profit mainly depend upon the general management which is afterwards pursued.

In a climate like ours, the winter management of stock is of particular importance, and demands the most earnest attention of every improving farmer. The first considerations are *a proper supply of nutritious food and shelter*. Cattle not only require a sufficient daily amount of nutritious food, such as good hay and roots, but during our long and rigorous winters, their warm and comfortable

housing is equally essential. This truth, in the abstract, we presume, will be readily admitted by all, but in practice it is too frequently but partially recognized. In passing through the country in the very depth of winter, how frequently does one see some ill-fed and equally ill-cared for animals shivering behind a fence or some dilapidated outbuilding, incapable of affording any shelter or protection worth mentioning. We are far from insinuating that it is wrong to allow cattle to go into the open air in the day time during winter. To young, growing stock, such exercise, and even exposure,—unless in the roughest and severest weather—is undoubtedly beneficial. But at nights all kinds of stock should be put into clean and tight sheds or stables; allowing of course sufficient ventilation for the preservation of health. To cows giving milk every sudden exposure to cold draughts of air, produces a check on their milk-producing capabilities, which become rapidly diminished by repeated exposure. Many fatal diseases, especially among horses, such as inflammations of the lungs, &c., are produced by sudden exposure to the wintry blast. It is therefore vain to attempt the unimpaired perpetuation of superior breeds of any kind of farm stock, unless strict attention is paid to their proper feeding and shelter.

Chemists have, of late years, discovered that what is termed animal heat, is produced and kept up by a peculiar kind of combustion of oxygen gas, with the food daily taken into the stomach. The more therefore an animal is exposed to severe cold, the greater the quantity of its food that is consumed in keeping up the temperature of its body, and thereby the increase of growth, fat, and muscle become seriously impeded; which is the reason why stock thus exposed always exhibit a poor unthrifty appearance, notwithstanding the large amount of nutritious food they may consume.

To show the practical importance of these considerations, we may mention that we have seen many instances of animals doing well on twenty or thirty per cent of less food, when accompanied by warm housing and regular feeding. A *mixed food*, consisting of chopped hay and straw—with bran or a little meal in the shape of a warm mash—with an occasional feed of turnips, carrots, mangels, &c., a punctual supply of water, and occasionally salt, with strict attention to warmth and cleanliness, will generally produce healthy, thrifty and profitable stock; which will alike redound to the advantage, skill, and humane feelings of the owner. There is an old adage which has come down to us in connection with sacred authority, and which it is both the duty and interest of the farmer to heed betimes: "The merciful man is merciful to his beast."

To kill Lice on Cattle.—If warm weather, apply soft soap, rubbing it to a lather, and let it remain until there is danger that the hide is too much irritated—a few hours will generally suffice, or sometimes a day. In cold weather, hog's lard will prove an effectual application.

WHAT THEY THINK OF CANADA AT HOME.

A few months since the Secretary of the Board of Agriculture transmitted some fifty or sixty copies of the 1st and 2nd volumes of the Journal and Transactions of the Board, to the leading Societies and public journals of the United Kingdom, France, &c. The party who took them to England, and undertook their distribution, informs us that the volumes have already excited considerable interest, and have called forth in the public prints very favorable remarks. He says that wherever he goes, particularly in the country districts, he is beset with people wishful to obtain valuable information respecting Canada; and that by putting forth sober and truthful statements in a popular way, a superior class of emigrants might be induced to make this country the land of their adoption. Several of the public journals have published extensive extracts from the *Transactions*, accompanied by favorable remarks, a proof that our agricultural organizations have not been unproductive of benefit to the Province, far beyond its own boundaries. The honorable distinctions that of late have been conferred on several of our public men by Her Most Gracious Majesty, and the cordial reception that has been shown them by members of the Imperial Government, and prominent British citizens, clearly indicate the high position which Canada has already attained in the heart of the empire, and which it is alike our duty and interest to consolidate and improve.

We subjoin an article from the *Mark Lane Express* of November 13th, a leading agricultural paper, as most of our readers are aware, published in London:—

TRANSACTIONS OF THE BOARD OF AGRICULTURE OF UPPER CANADA, 1856. TWO VOLUMES.

Toronto: Printed for the Board of Agriculture, by Thompson & Co.

No one in future will be able to say that Governments never learn wisdom by experience, since our own came to the resolution to invest our colonists in various parts of the world with the privilege of self-government. The day has now gone by for ever when any ignorant noodle of an aristocratic family was considered good enough to govern a distant colony under the directions of as great an ignoramus as himself, in the shape of a Colonial Secretary. Because colonists are the children of the mother-country in one sense, our rulers considered and treated them as real children—babies—and kept them in the everlasting go-cart or leading strings. If they grumbled at this they were treated as disaffected; if they resisted, as rebels; and the only resource left to them was to "cut the painter" (as a sailor would say), like the American colonists, and set up on their own account. It took our wise heads nearly eighty years to study that lesson; and nothing but the danger of losing Canada altogether opened their eyes to the truth, that *any body of grown-up men know their own wants better than persons at three thousand miles' distance.* The first experiment was made in British North America, and, to the astonishment of our *Wittenagemot*, it succeeded so well, that it was extended to all the colonies, at the Cape and in Australasia, and more recently to India, where it has been equally successful. It is, however, with the first of these only that we have at present to do; and also to its agricul-

ture alone, as more legitimately coming under the surveillance of an agricultural journal.

The interesting publication we take for our guide refers only to Upper Canada, that being eminently a British colony, and exhibiting, since its emancipation from the fetters of Imperial government, a progress in its moral, intellectual, and industrial affairs unprecedented in the history of colonization. With respect to the agricultural societies of Upper Canada, their establishment, under Parliamentary enactments and patronage, dates back to the year 1830; and, from that period to 1854, nine Acts were passed for their regulation. At the former period the population of Upper Canada was only 210,000, the assessed value of property nearly £3,000,000, and the number of districts eleven, each of which had its agricultural society, with a grant of £100 from Government for its support. In 1853 the population had risen to one million, the assessed property to £40,000,000, the number of general agricultural societies to 41 (each of which has branch societies in the several townships), and grants from Government from £150 to £250 each. The aggregate sum raised by the members was, in 1856 £5,877 8s. 2½d., and the Government grants £8,198. A portion of these funds is wisely expended in the purchase and importation of breeding cattle, sheep, and pigs, of the improved breeds, the males of which are let out to hire for the season to members of the societies. Annual exhibitions are held, at which prizes (rather *too numerous*) are awarded for the same objects as in England. The impulse given by these societies to the husbandry of Upper Canada has raised that splendid province to the highest rank as an agricultural country on the North American continent.

The first exhibition took place at Toronto in 1846. It was of a general provincial character, and was eminently successful; some of the Durham cattle being of the best type, and fetching high prices. Other products, also of great excellence, were exhibited; and, upon the whole, the display excited the astonishment of those who visited the show, and were competent judges of the result. On this occasion a Board of Agriculture for the whole province was established, with E. W. Thomson, Esq., for President; and the Provincial Agricultural Association was also inaugurated, which has since been the means of so greatly advancing the general prosperity of the province. The capability of the soil of Upper Canada for improvement, was strikingly illustrated by the Hon. Adam Fergusson, by a reference to the case of Messrs. Culley, on the farm of Wark. The crop was valued to them at the rate of 15 bushels of oats, and 9 bushels of wheat, per acre. Fifteen years after, another valuation took place, when the estimate was 84 bushels of oats, 62 of wheat, and 72 of barley, the green and live stock being in a somewhat similar proportion.

Since that period the association has gone on with increasing prosperity, holding its general meetings every year; and by the encouragement it holds out to improvement in cultivation, in the management and rearing of stock, and in the invention and manufacture of agricultural implements and machinery, we ought to add, that the interest and importance of the progress made, equally increases as the society advances, from year to year. This will appear when we state that whilst the proceedings of the society for the first year occupied only forty-eight pages of the report, those of the tenth year [1855-6], including the reports of the local associations, fill up 356 pages, exclusive of a Prize Essay on "Insects and Diseases Injurious to Wheat Crops," by H. Y. Hind, Esq., M.A., a review of which recently appeared in this journal. This report, which forms a considerable and complete volume, contains most interesting matter for those who contemplate emigrating to that rising country, which will become doubly important as the future high road to British Columbia, likely to prove one of the richest and most desirable of our Colonial possessions; we might add the most

important, as lying on the Western coast of the North American Continent, and affording direct communication with India, China, Australia, and the South Sea Islands.

A great change has taken place in Canada since the boon of self-government has been so justly awarded by the mother-country. We no longer hear of those well founded complaints of mal-administration, disaffection to English rule, and threats of joining the American Union. Never, even in the "old country," were the people so happy, prosperous, or loyal. Indeed, generally speaking, their attachment to the Queen is more strong now that they are removed from the immediate pressure of royalty; and we firmly believe that in the event of a war with the powers of the Continent, Upper Canada would not only cheerfully furnish her portion of expense towards the warfare, but her contingent of men to fight the battle of their father-land. The present excellent governor, Sir Edmund Head, is the patron and supporter of every industrial institution, and the promoter of every useful national undertaking. Under his government those important works the Grand Trunk Railway and the Tubular Bridge over the St. Lawrence have been constructed at an expense of several millions sterling, which open up speedy communication between the most remote portions of British America, and will now undoubtedly ere long be extended to the shores of the Pacific Ocean. A grand future is, therefore, opening for Canada, as the highway to the West; whilst the favourable climate of the Upper Province, where the winters are shorter by five or six weeks than in the Eastern Provinces, renders it a much more desirable residence for Europeans.

England may well exult in having such a colony—such a resource for her teeming and over-crowded population; nor less ought she to do so on seeing the result of the liberal policy adopted [at the eleventh hour, it is true] towards it by her Government. "Wise and happy will that nation be," said a French statesman before the American War of Independence, "which shall first consent to see its colonies *allied provinces*, not mere dependencies of the mother-country. Wise and happy will that nation be which will consent to recognise as the only principle of consequence in commerce the employment of all its lands in the manner most advantageous to the owners, and all its labour in the manner most advantageous to the individual labourer, that is, the manner in which every man would use both of them, if he were permitted to do so, for his advantage."

Upper Canada is *the* country of the British agricultural emigrant. It is essentially English in its manners, customs, religion, language, industry, and, in fact, in all respects that can possibly render it a *home* to an Englishman tired of battling with the anxieties and drawbacks on prosperity in the "old country." It has also started into life with all the advantages of the experience of the mother-country, and full scope for their employment and development. There is, therefoar, no interval between the infancy and full manhood of the colony. As soon as the pressure of paternal superintendence was removed, it rose to its full stature at once, and showed that nothing but that interference had prevented her from sooner displaying her capabilities.

The indifference with which all Americans regard the passage of a funeral procession is proverbial. Now the French people, from a regard to the feelings of mourners, as well as respect for the memory of the dead, when they meet a funeral procession, stand still and uncover their head in the street while the procession passes. A most touching tribute to the memory of the dead. We most earnestly wish our people had the heart to imitate it.

THE PROGRESS OF ENGLISH AGRICULTURE.

Concluded from Page 228.

The spirit of the old agriculture and the new are diametrically opposite—that of the old agriculture was to be stationary, that of the new is to progress. When Young made his tour through the east of England in 1771, he remarks as a peculiarity that the turnip cabbage of a Mr. Reynolds, which had a special superiority, was gradually adopted by his neighbours—'a circumstance,' he adds, 'that would not happen in many counties.' His works, are, in fact, a narrative of individual enterprise and general stupidity. A Mr. Cooper who went into Dorsetshire from Norfolk could only get his turnips hoed by working himself year after year with his labourers, and refusing to be tired out by their deliberate awkwardness for the purpose of defeating his design. After he had continued the practice for twenty years, and all the surrounding farmers had witnessed the vast benefits to be derived from it, not a single one of them had begun to imitate him. Mr. Cooper, with two horses abreast, and no driver, ploughed an acre of land where his neighbours with four horses and a driver ploughed only three-quarters of an acre. Yet not a labourer would touch this unclean implement, as they seemed to think it, and no farmer, with such an example perpetually before his eyes, chose to save on each plough the wages of a man, the keep of two horses, and the extra expenditure incurred by the diminished amount of work performed in the day. No longer ago than 1835, Sir Robert Peel presented a Farmers' Club at Tamworth with two iron ploughs of the best construction. On his next visit the old ploughs with the wooden mould-boards were again at work. 'Sir,'' said a member of the club, 'we tried the iron, and we be all of one mind that they made the weeds grow.' On Young recommending the Dorsetshire agriculturists to fold their ewes in the winter, they treated the idea with contempt; and on pressing them for their reasons, they replied, 'that the flock, in rushing out of the fold, would tread down the lambs,' though no such accident had ever been heard of, 'and that the lambs would not be able to find their dams in a large fold,' though certainly, says Young, 'a lamb in Dorsetshire has as much sense as a lamb elsewhere.' Whether the method has been beneficial or not, the grounds for rejecting it were equally absurd. Of two neighbouring counties one was sometimes a century behind the other. A lazy desire to creep with sluggish monotony along an established path, and a feeling of impatience at being pushed into a novel track, helped to maintain hereditary prejudices, and tenants invented fanciful excuses fer not doing what was plainly advantageous to be done, because they preferred present sloth to future profit. They were like a man who had lain upon one side till he shrunk from the trouble of turning over to the other, through when the process was performed the new posture might be easier than the old. But once roused and put in motion, and the inherent reluctance to stir being overcome, the gain in interest as well as in pocket was felt to be great. He who has profitted by one innovation is ready to try another, and his pride and his pleasure is to improve where his fathers gloried in resisting improvement. There are still large districts of England which have yet to be converted to a rational system of agriculture—landlords who are ignorant of the principles of management which attract or create intelligent tenants—and tenants who are ignorant of the methods by which the land is made to double its increase. But the wave of agricultural progress has acquired irresistible might, and they must mount it or it will sweep them away. The best thing which can be done for these laggards in the race is to persuade them to take in an agricultural newspaper, to get them to consult the commercial travellers who collect orders for the manufacturers of ar-

tificial manures, to talk them into replenishing their worn-out implements from the mart of the great makers, to prevail on them to visit the annual shows of the Royal Agricultural Society, to throw them, in short, in the way of seeing the products of advanced husbandry, and of hearing the ideas of enlightened cultivators. By some or all of these means they may be put upon the high-road to improvement, and when they have gone an inch there is little fear, unless they are afflicted by a hopeless incapacity, that they will refuse to go the ell. He who lives within the diameter of a little circle has ideas as narrow as his horizon, but the influence of numbers and skill together is irresistible, and no impersonation of ignorance or bigotry has probably ever visited a single great agricultural exhibition without returning a wiser and a better farmer.

STEAM CULTIVATION.

[Mechanical science is rapidly overcoming what have hitherto been considered as insuperable difficulties in the employment of steam as a motive power in the cultivation of the soil. The last number of the *North British Agriculturist* contains a report of Professor J. Wilson's Lecture on Steam Cultivation, delivered to the Agricultural class in the University of Edinburgh. As the Professor is well known to, and highly appreciated by a number of the leading agriculturists of this province, and the subject on which he so ably treats possesses a general interest, we are induced to transfer the report to our pages without abridgment.—*Editor.*]

The Professor intimated that he intended to confine his observations to "Steam Cultivation," because it was a question which had, he believed, a deeper and far more important bearing on the country at large than even its most sanguine supporters at present claimed for it. After remarking that the present year would stand more prominent than most in the history of agricultural progress, as that in which the great problem of steam cultivation had been solved, he said he had thought it desirable to discuss the subject on this occasion, so that it might get a little publicity by their meeting; because, although it had made wondrous progress during its short existence, still it was one entirely new to the great majority of agriculturists in the south, and to a still greater number in this part of the kingdom. He then gave a rapid but interesting sketch of the progress which had been made in the plough since primitive times, contrasting, as he went on, the rudely-constructed implement of the ancient Egyptians with the finely-proportioned broad-mould now turned out of our manufactories. In principle, however, both implements were the same, and practical men had been long turning their thoughts to ascertain whether some better principle could not be brought in to supersede what had been so long in use. The great desideratum, said the lecturer, therefore, has been to obtain a machine that shall have, like the plough, the capability of doing a large amount of work, and like the spade, of doing it in such a manner as to satisfy those conditions which we consider desirable for the purposes of successful cultivation. This twofold desire seems to have been held by the Council of the Royal Agricultural Society, when three years ago, they offered a prize of £500 for the "Steam Cultivator that shall in the most efficient manner turn over the soil, and be an economical substitute for the plough or the spade." At the Chester meeting of the present year it was decided that the problem had been solved.

The £500 prize was awarded to Mr. Fowler, while a large gold medal of honour was awarded to Mr. Smith. Noticing, in passing, the steam machines that had been constructed by the Marquis of Tweedale, Mr. Usher and others, as implements which had been of great advantage in turning public attention in the direction of steam ploughing, the lecturer proceeded to give a description of Fowler's steam plough, illustrating his remarks by a number of large and well constructed diagrams, suspended on the walls of the lecture room. The principle of Fowler's plough by steam traction was essentially different from that of other inventions, in which the plough moved across the field, carrying the shares along with it. After showing the amount of saving—in some light soils from 2½ to 25 per cent., and in clay soils from 20 to 50 per cent.—which the steam plough could effect in the tillage of the ground, the Professor noticed in succession the main features of the different ploughs that had been invented, and proceeded to consider other advantages which it possessed over the hand plough. The careless labourer can no longer scamp his work by running a shallower furrow either for the sake of less work for himself, or that his horses may look sleeker and in better condition. The furrow will be regular throughout—the width and depth throughout alike—set up at the same angle, and capable when weathered or torn down by the harrow, of forming a seed bed in which germination would proceed under the best conditions. And, better than all, not only is the subsoil freed from the lever pressure of the plough sole, but both the upper and the lower soil are tilled without the trampling and kneading of iron shod hoofs—harmless it may be on light sandy soils, but wofully injurious on the moist loams or tenacious clays, which are the steam plough's own domains. The steam cultivator breaks up and pulverises the soil far more effectively than could be done by mere horse-flesh, on account of the continuous and equal force it applies, and the rapidity with which it moves. No animal power could be used in such an unconcentrated form, neither could we, by any other means at present known to us, leave the torn and displaced soil in such an open condition, and so suitable for the action of drainage, and the subsequent processes of cultivation. But it is in deep tillage, and on the strong clays, in work too heavy for the ordinary strength of a farm, that our new friend shews to greatest advantage. The heavier the draft, and the moister the soil, the more our teams pull at disadvantage to strength, and the greater the relative cost per acre—and there is a limit to the power of horses which we can profitably employ. The Professor also pointed out its great advantages in saving time, and allowing the farmer to seize the opportunity of a favourable break in the weather for prosecuting his ploughing, without the vexatious delays to which he was at present exposed. In getting in spring corn between the catching showers of February, March and April, how much, he said, would the average yield be raised, and the success of the crop be secured, by a machine that could reduce weeks into days, and begin its work before a horse would be allowed to put his foot upon the soil. What proportion of our root crop is backwarder and inferior in bulk to the rest, for want of having been able to get in all at that golden moment when the best portions were sown! One of the boasts of drainage was, that it rendered the farmer independent of the seasons; but it remained for the steam cultivator to complete his independence, by giving him the power to choose his own time for his necessary tillage operations. Again, on light soils, where the climate gives an early harvest, advanced farming claims more than one crop a year; it is simply want of power to carry out the processes of preparation quickly enough that limits the spread of so desirable and so profitable a system. Then the rapidly increasing practice of autumnal cultivation, for which our leading farmers are providing themselves with steam machinery, scarcely looking for any further advantage from them. After the clover leas and spring corn stubbles are

prepared for wheat sowing, there are the wheat stubbles to be fallowed for the green crops, usually a tedious and costly affair—with winter and spring ploughs, scarifyings, draggings, rolling and harrowings, before a satisfactory tilth is obtained, and all the couch and other weeds got rid of; while on many strong clays a whole year's fallow is necessary before the necessary conditions can be secured. But an autumn day's dry tillage, when the root weeds are young and weak, and the temperature of the earth and atmosphere high, is of far more value than a week's work after the cold and rains of winter; and with the cultivator in its various forms we can pulverize the soil with the efficiency of the old Roman plough, and leave it either open or ridged up to the mellowing action of the still powerful sun. We may fairly expect by autumnal cultivation to save two ploughshares in the fallowing—the land is kept more clean and at a lower cost—moisture is retained in the turnip land by avoiding tillage during the drying winds of the spring—and on clay soils a root crop is obtained upon part of the otherwise bare fallow; yet only under the most favourable circumstances and in but few localities, can this advanced and desirable system be carried out successfully, owing to our limited power and the pressure of other operations. So that steam cultivation was, as it were, a new faculty, cleansing and preparing our land at a reduced cost, fertilising it by autumnal exposure to the sun and air, forwarding the preparation for our spring seeding, and placing within our reach profitable crops, which hitherto have been comparatively unattainable. This is no imaginary picture; it may be seen as the result of a four years' practice by Mr. Smith at Woolston, where a strong and cold clay farm of the most pauperising character under the old system, has been converted into a soil, "deep, rich, absorbent and friable as a garden." The ruinous dead fallow is abolished, yet the farm is a pattern of cleanly culture; and, without purchased artificial manures, very heavy crops of roots and grain are grown with a produce and a regularity quite unknown before. This change has been effected by his new system of steam cultivation, which has produced him a regular increase of at least eight bushels per acre, while the entire cost of preparing his land for seed has been (on the average of the four years) only 11s per acre. Mr. Mechi tells us that he has found a like increase on his heavy open clays due to the employment of Fowler's steam plough; and in some light soils in Suffolk the effects were equally satisfactory. The superior power of steam to horses in time, in force, and in cost—all and each of deep importance to the farmer—would be more readily recognized were we to give a little more consideration to the cost of horse power than is usually done. Hitherto our trials have had reference to the comparative merits of the implements used, and important results have been obtained as to their relative drafts in the same soil. What we want now is to ascertain the comparative resistance of different soils, and then calculate the cost of draft per acre in each; this would give at once a clear notion of the important part that steam is likely to play in our field operations. We have a good starting point for our calculations in the known value of the draft force of a horse. Every one knows the enormous difference in the texture of our soils, which our somewhat imperfect dynamometers have shown us to have a range of draft of from 2 cwt. to 12 and 14 cwt. for the 6 by 9 furrow; and yet few of us have correct ideas of the different cost of Norfolk and Kent ploughing, or of the increasing ratio of expense, where the resistance exceeds that which horse-power can economically overcome. The draft power of a horse in ordinary condition is estimated at 1¼ to 1½ cwt. Let us take the maximum, which would show us that a soil offering a resistance of 3 cwt. was a fair test of a pair horse power, and that they would readily do such work without extra keep and without losing condition. Double this draft, and make your horses struggle through it and what is the result? Either they must do a considerably les

amount of work in the same time, or they must consume an increased amonnt of food, or they must speedily show by their depreciated condition the wear and tear which has been silently going on by the uneconomical expenditure of their powers. Force cannot be generated—it must have its equivalent somewhere—either time or material must be given to balance it; and either or both of these must be paid for somehow. From my own calculations, I am inclined to think that the money equivalent of horse power 6 by 9 furrow per acre in ploughs is about 2s 6d per cwt. of draft on the lightest soils; but that this ratio of costs increases with any increase of resistance offered. Now, if we could draw out any scale of this sort, it would readily be seen upon what soils horse power could economically be employed, and where steam could be introduced with advantage in the cultivation of the farm; for steam, we must recollect, owes no allegiance to the laws which limit animal power. Our trial experiments so far are in accordance with our previous ideas—that on light soils steam exhibits but a small advantuge over horse power, so far as mere cost is concerned, but that on medium and heavy soils its great economical advantages are seen increasing as the natural difficulties of the soil increase. The vast strides, said the lecturer, which agriculture has been making during the few past years in all the processes and operations of the farmstead and of the field, in the economical manufacture of both animal and vegetable food, have stimulated our engineers to assist us in compelling our fields to pay an increased tribute to the increased intelligence and requirements of the day, and have prepared the master minds of her followers to receive steam cultivation as one of the most important and acceptable offerings that could be made to her. Already the white flag of steam tillage may be seen flying in various parts of the country, and each inventor as he brings his machine into successful operation in the fields, finds no lack of encouraging purchasers. Let the memory run back but a short fifty years, and note the changed condition of our fields. The careworn soil may indeed deplore the days of easy farming and long idle fallows—it has since then known no rest. For ever knocked about, it never knows in what form to expect its next blow. Its surface forced to wear a regulation garment of everlasting green—drained of the moisture it treasured in the depths of its old lazy content—pierced with fistulous passages of miles of hard piping—submitting to all sorts of rough treatment, scarifying, crushing, drilling—ploughed, and harrowed, and rolled, to the utter confusion and pulverization of its clod existence—every kind of horrible compound that fish, bird, man or beast can conjointly or severally furnish, driven into its texture—when early clothed with nature's youthful verdure, soused, irrigated, and polluted with liquid extract of solid nastiness. Though thus abused, and under a constant screw, it has proved grateful; it has shown its powers to be equal to the requirements of the day—to meet low prices by quick returns—and has met the lessened value of its productions by a continued increase in the amount produced. We have seen steam, too, leaving its factory-home and enlisting in the service of the farm; and our new and faithful ally has been welcomed far and wide, and has found a home in the farmsteads of well-nigh every county of the kingdom. In the early days of our acquaintanee we tried its powers with natural hesitation and diffidence both of our own wants and of his strength; but as our acquaintance improved, and we could better understand its value, we threw aside our reserve, and confided to it the important conversion processes of the steading, and grateful for the benefits it has conferred on us then we now, with an increased confidence, intrust to it the still more important production processes of the field. Let us then aid its progress as much we can within our respective spheres, confident in the belief that the day is not far distant when it will justify its claims to be considered as the greatest in its results of all the advances which have from time to time lent a hand in revolutionizing the agriculture of our country.

THE PROGRESS OF AGRICULTURE IN GREAT BRITAIN.

Mr. Philp's history of Progress in Great Britain, is a most interesting work, abounding in curious research and important suggestions. The following is an extract from the Agricultural section :—

Commencing at the earliest period of British history, we are carried through the different ages of alternate advance and retrogression, thus rendered by the existence of peace or war. The most baneful periods to agriculture were those of the civil wars, which appear to have paralysed every effort for advancement in any art or science. The agressive wars, too, of Edward III. and Henry V. were highly injurious to the progress of agriculture, by the constant draining off the rural population to supply the ranks of the armies in France. It was not, however, till the beginning of the sixteenth century that agriculture received any attention beyond that of the yeomen themselves,—the pursuit being held as almost contemptible. But about this time several books appeared on the subject, the earliest of which of any importance was "The Booke of Husbandrie," by Sir A. Fitzherbert, published 1534. In 1562 a very curious work by Martin Tusser, entitled "Five hundred points of Husbandry," appeared :—It was printed in black letter, and from this we will give the same extract as Mr. Philp quotes, it proving that a succession of white crops was even then considered injurious to the land :—

"Otes, rie, or else barlie, and wheat that is gray,
brings land out of comfort, and some to decay:
One after another, no comfort betweene,
is crop upon crop as will quickly be sene.
Still crop upon crop many farmers do take,
and reape little profit for greadinesse sake."

In this way, with much quaintness, the rules of husbandry were given, and few then known omitted. Mr. Philp remarks that "Great stress was laid by the olden writers upon the effects of the moon and wind. In Goodge's 'Booke of Husbandrie,' 1577, farmers are told to 'look that the wind be westerly, and the moon in the wayne;'—and another work, 'The perfect husbandman,' published 1657, says, That the observation of the moon and the wind helpeth greatly to the bettering of the ground.' The aid of chemistry in those days was never thought of: to charms, witchcrafts, and sorcery, either good or ill success was attributed." After taking us through the history of agriculture up to the end of the seventeenth century, the author concludes this interesting work with some excellent observations on the advancement made during the last half century, and deducing therefrom valuable statistical information. The work is well printed, and abounds with richly-executed illustrations of plants, animals, and machinery.

In Young's time, farmer's very rarely ventured beyond the boundaries of their own locality; the market or the fair were their chief opportunities of intercourse, and there was too much eagerness to sell or buy, too much excitement from beer, to enable them to discuss anything of an improving tendency. Besides, the farmer was a man of prejudices; he would scarcely look over a hedge to watch the progress of an experiment. When the father of Mr. George Turner, of Barton, Devon, the well-known breeder of Devon cattle and Leicester sheep, who had learned something in his visits with stock to Holkham, began to drill turnips. a well-to-do neighbor looked down from the dividing bank, and said to his son, "I suppose your father will be sowing pepper out of a cruet next!" Jethro Tull said, that the sowing of artificial grasses was so long

before it became common amongst farmers, that though Mr. Bilth wrote of it in Cromwell's time, yet thirty years ago (about 1770) when any farmer in the country was advised to sow clover, he was certain to say, "Gentlemen might sow it if they pleased; but they (the farmers) must take care to pay their rent." And now the case is so much altered, that, theugh rents are increased, and the profit of clover is less since it has become common, they cannot pretend to pay their rent without sowing it.

MISCELLANEOUS.

Australian Flowers.—The native rose has the color but no other resemblance to the European queen of flowers. It is one of the few field flowers possessing any odor. Wafted on the passing gale, it commends itself pleasantly to the senses; but strange enough, on closer acquaintance, there mingles with the rich perfume an undoubted smell of fox—a scent which, however productive of rapture in "the field," is hardly adapted to the boudoir. In the low lands of the Botany scrub I noticed a crimson and orange flower, like the foxglove in form, very handsome, but so hard and horny in texture, that the blossoms actually ring with a clear metallic sound as the breeze shakes them. It might be the fairies' dinner-bell, calling them to dew and ambrosia! But alas! there are no "good people" in Australia! no one ever heard of a ghost, a bogle, or a fetch, here.—*Mundy's "Our Antipodes."*

The Happy Family.—Conversing with the proprietor of the "Happy Family," which stands on Waterloo Bridge, London, I was informed that this exhibition had been in his family upwards of thirty years; and that the mode he got the animals to agree was by placing always young ones in the cage in the place of those who died. The mapie was the patriarch of the cage: he had had this bird five years, hopping about and chattering. The next to the magpie was the starling; he had been in the cage two years. He left all the creatures in the cage together regularly every night—owls, rats, rabbits, jackdaws, dogs, &c.; but he was obliged always to take the monkey out, and put him in a different place, he was so very mischievous, and kept all the other animals awake, teasing them when they were asleep. "Ah," said he, "them monkeys is awful blackguards."—*Buckland's Curiosities of Natural History.*

A Hard and Durable Soap.—A patent has been granted in England for an improvement in the manufacture of soap, by the addition of sulphate of lime to the usual ingredients employed in its manufacture. The sulphate may be added with any of the usual ingredients employed in the manufacture of soap. The proportions of the sulphate which it is best to employ, vary according to the article manipulated upon, and the quality of the soap to be produced. Thus about twelve ounces of dry sulphate is sufficient for one ton of best soap, whereas, in common or highly liquored soap, six or eight pounds may be used with advantage. Soap, made with the addition of sulphate of lime becomes hardened, keeps dry, and is not liable to shrink while in water, its durability is increased, and it does not wear or waste away before its cleansing properties are brought into action.—*Scientific American.*

Scotch Snuff vs. Green-fly and Thrips.—I find accidentally that a slight powdering of common Scoth snuff destroys green-fly and thrips. I should feel obliged if you would say whether there is any objection to the use of it generally. [None, except expense.] I ask because so much has been written lately about the aphis powder that I conclude there must be some good reason against

the use of snuff, in itself the cheapest and easiest used powder, unless its subsequent effect on the plant is injurious. One ounce of Scotch snuff administered by a pepper castor will go a long way in a green-house, and any one who will try it upon a bud or young shoot covered with the well known pest will have at least the satisfaction of seeing the whole force of the enemy strewn on the surface of the pot in about five minutes, unless you decide that it is dangerous.—*London Gardener's Chronicle.*

Gathering Fruit by Machinery.—William Doty, of South Hartford, New York, has invented an apparatus for gathering and sorting apples. They are shaken from the tree by a pole made to grasp the limb. As they fall they are caught by an inclined cloth, stretched on a frame, through an opening in which they pass to a grating that retains the larger apples, which are drawn through a spout into bags or barrels. The smaller apples drop gently on a lower grating—through which the sticks, leaves, and other foreign substances can pass and allow the apples to roll down a spout. Should the apple not be very regular in its form, it will not roll from the grating, but will stay upon it to be removed by hand—thus the apparatus will only deliver such apples as are marketable, and divide them into sizes fit for the same. This invention will interest our fruit cultivators, as it is one of the most difficult of things to gather apples so as to have them fit for long keeping.

GEOGRAPHY OF PLANTS.

Wonderful and beautiful is the variety which marks the vegetable world! Were all vegetation confined to one single species, as the mullein, the dog-fennel, or even the beautiful and useful wheat plant, how soon the mind would clog of their charms and nervously turn away for some new plant whose other form of stem, of foliage, or flower might bring relief and a new joy to the weary eye. But such it is not. Nay, on the contrary, so great is the multitude of varieties that botanists have not yet been able to number them—thousands and hundreds of thousands have already stood for their portraits, and every day rewards the eager search of some zealous naturalist with a new discovery. And then the extent of this variety! From the dear little blue-bell on rocky crag, far from the haunts of men, to the earth-screening Banyan and grand old Baobab whose germs began to swell under the sunlight of the first roseate morn, and whose grateful shadows have been lovingly spread ever since for the laughing sports and idolatrous worship of untold generations, how infinite the variety of color, form, and use!

But not all of these belong to the same locality; as all classes and families of men are not to be found in any one country—except America! Nevertheless the distribution is not of chance but had its origin in certain necessities of soil and climate and in the special wants of the people and animals destined for the various portions of the earth.

If the Creator had made the earth perfectly even on its surface, with the water and land arranged in alternate belts, and perfectly homogeneous in its chemical constitution, then the climatology of the world would have been comparatively simple and the Geography of Plants a mere question of latitude or longitude. It so happens, however, that neither one of these conditions is true; for so far from being perfectly smooth and even surfaced, the earth is exceedingly rough and irregular in the distribution of land and water; and instead of homogeneity, there is no single handful of its substance of one kind, unless it be here and there a lump of one of a few metals which occur pure. Everywhere there is the greatest diversity, both in the general configuration, and in the chemical elements of which the earth is composed; no two square miles of the earth are exactly alike, either in the character of the surface or the nature of their constituents.

It must be apparent, therefore, that the problem of distribution is complex and difficult, requiring in order to its complete solution a perfect knowledge of Geology and Mineralogy, Botany, Chemistry, Physical Geography and Meteorology. Accordingly,

it was not until the great mind of Humboldt, with its wonderful power to grasp the cosmic relations of material things, devoted itself to the task, that anything like a philosophy of distribution was offered to the scientific world.

The materials had been brought piece-meal to the feet of this great man, whose work it was to build out of them the splendid fabric of a great generalization. But even he has as yet been only able to lay the broad foundation upon which the scientist of the future must rear the superstructure of a complete science.

It was natural in the beginnings of botanical science that the description of every new plant, whether new to the world in general, or only in the particular locality, should be accompanied with a mention of the place where it was found, although no reference whatever was had to the deduction of a general law. Thus it was found that a certain class of plants were chiefly confined to a definite zone, or still narrower range, sometimes even limited to a small circumscribed locality, never being found elsewhere or susceptible of easy cultivation in any other part of the world, however like the place of its habitat. For instance, of the numerous species which grow in New Holland, very few are found in other parts of the world; while of the sixty-three or four peculiar to St. Helena, only two have been discovered elsewhere. So also, it sometimes occurs that upon the two sides of a given range of mountains totally different varieties of plants are found; from all of which facts it will appear that the vegetahle world is really much less independent of circumstances than the animal—it seeming to have been the intention that animals being gifted with powers of locomotion should seek such localities as furnish the food to which they are partial. True, we have the power of manufacturing a given climate to order, on a small scale, but the uses of such artificial climate can never be more than very partial and imperfect; the exactions of nature are rigid, her claims imperative.

The nature of the relations which subsist between the vegetable and the animal kingdoms, and the joint relation of both to the climate where they are native is one of the most interesting studies in the whole range of natural science, and might with propriety be noted in this connection; we are not willing, however, to embarrass our present subject with any discussion not strictly essential to its completeness, and shall hence defer it to the general department of Uses of Plants.

The important discovery of Humboldt that the parallels of latitude do not demark either zones or more specific climates was the first great contribution to the science of climate, and gave rise to what are now known as *isothermal* lines, (lines of equal annual temperature,) *isotheral* lines, (lines of equal summer heat,) and *isochimenal* lines, or such as pass through places on the earth whose mean winter temperature is the same.

To any one accustomed to associate a definite climate with a particular degree of latitude, the tortuosity of these several classes of lines will be au occasion of no little surprise. Sometimes in their windings they cross several parallels and then suddenly and by an almost due north or south course return to the parallel of departure, or, even crossing it, deviate as far in the opposite direction.

Now so far as these lines are concerned, they are quite satisfactorily explained upon the ground of the physical configuration of the surface—and the astronomical lines which govern the earth—mountain ranges, lakes, rivers, plains, &c., &c., all have a modifying influence, and to the man of science determine what must be the nature of the vegetation of any given locality.

To illustrate briefly:—Every one familiar with the mass of the world and the general botany of the old and new continent must have been struck with the fact that fruits and grains belonging to the temperate zone grow much further north on the western coast of Europe than any on the eastern coast of America. Indeed so almost identical with the fruits of New England are those of Great Britain, that many, who have not reviewed their geography for some time, find it difficult to believe that the parallel of latitude which just touches the southern coast of England is the same which passes through British America, some two degrees above the extreme northern limit of Lake Superior. A proper understanding of Physical Geography, however, renders the explanation quite simple, as follows: Owing to the spheroidal form of the earth, its revolution on its axes and the peculiar relative position of land and water there exists what is known as the Gulf Stream, whose warm waters moving in a north-easterly direction from the Gulf of Mexico wash the western coast of England and thus raise its temperature above what it would otherwise be; while on the other hand the eastern coast of America is washed by the cold waters and influenced by the cold winds from the regions of Iceland and Spitzbergen; thereby reducing the temperature considerably

below that which might otherwise be expected. So that in this case we have two opposite causes conspiring to increase the difference between the climates of the two countries.

In like manner smaller bodies of water, as inland seas and lakes, exert a modifying influence, as we who inhabit the northern tier of States can testify from our own observation. Prairies, highlands and forests also enter into the problem of climate, and while they render it when irregularly arranged, more difficult of solution, yet if properly understood in their individual influence, will enable the climatologist to explain many anomalies in the Geography of Plants. This branch of our subject will be discussed, however, under the head of cultivation of Plants, and may, therefore, be dismissed for the present without further remark—only, that certain specialities in the distribution of plants appear to involve unknown quantities or elements, the determination of which is essential to a complete understanding of the subject. Indeed it is probable that not until more is known of certain intangible elements, and the mean temperatures of localities for less periods than years and half years, many questions of interest and importance must wait for an answer.

If it be true, as we have attempted to prove, that the sunbeam is the motive power which drives the machinery of the great vegetable world, then we should naturally look for the most marked results in these portions of the earth where the intensity of this force is the greatest and where it is most persistently applied. In other words we should expect to find the vegetation of the equatorial regions, where the sun's rays fall most perpendicularly, and operate therefore with concentrated force, the most luxuriant, and a gradual dwindling down in thriftiness of growth as we approach the polar zone. And such is really true; for the tropics display the most luxuriant growths in the world.

It is there that the magnificent Ferns and Confervæ shake their evergreen leaves, and shoot toward heaven, and the over-topping Palm waves its tufted coronal high above the other trees of the forest, and there that the Dragon-tree stands suggestive of centuries that have been. No billowy meadows of tender grass carpet the heated plains, for under the powerful stimulus of the tropical sun, every plant aspires to be a tree!

But gradually this luxuriance diminishes, so that proceeding poleward, the Palm dwarfs a little, gradually becoming less and less until at last it altogether disappears. Still there are great forests of evergreen trees, around the mighty trunks of which are trained the Vine and fire-tinted Bignonias; Crucifers and beautiful Rock-roses abound, and the gorgeous colorings of equatorial plants assume more modest hues.

Next we reach the zone which is mixed of the deciduous and ever-green woods, whose sombre hues contrast so beautifully with the bright, soft green radiant meadows; rich mosses, hitherto unknown, here clothe the trunks of aged trees; leaf-buds before unprotected assume *tegmenta* or coverings; but Lime and Orange groves are there for the refreshment of thirsty man and the Hop and Clematis twine the sturdy stems of giant growths.

Then come the lofty graceful Elm, the massive Plane and Cotton-wood. Among the grasses the Rice-plant holds important rank, furnishing much of the food consumed by the inhabitants of that semi-tropic, semi-temperate zone. A little higher still, Oak also begins to appear, and the drooping Cypress. Corn and the Sugar-cane have their best development, and the garden fruits of the summer of more northern latitudes offer their tempting food in the middle of winter.

Even as far north as the 30th parallel, Nature plies her work from the beginning to the end of the fruit-burdened year, nor ever thinks to stop for rest or sleep. Corn and the cane are important products of her toil, and here she prepares her sweetening for the world of men.

Next we meet—at least on the American continent—with the Beech, the Hickory, the Walnut, the Ash, the Oak, and the Butternut, the 40th to the 50th parallel being their true habitat, although some of them, particularly the Oak and the Beech, are found as far north as the 60th. It is within this range, also, that the cereal grains have their most natural growth. Wheat, oats, barley, rye and Indian corn are the chief products of the field; the last mentioned flourishing, as said before, considerably further south, while the first and third may be, with some difficulty, produced as far north as latitude 65°. This belt of earth also includes the Vine, whose extreme northern limit is the 55th parallel. The Birch, the Larch, the Pine and the Fir are the principal forest trees along the upper skirt, and even these begin to dwarf after the line of 60° is crossed.

Approaching the pole more nearly, the tree becomes the shrub, and finally the shrub dwindles down until the whole of vegetation consists of a few species of Lichens, Mosses, and the Red Snow Alga is alone left to bedeck the wide wastes of ice-covered plains.

Such is the birds-eye view of the Geography of Vegetation, highly interesting in itself, and a thousand times more so when viewed in its relations to the animal kingdom. In our next, we shall enter upon the practical subject of the cultivation of plants.—*Wisconsin Farmer.*

THE GRAPE VINE.

BY THOMAS BAYNES, OF BALTIMORE.

Soil.—The natural soil most congenial to the growth of the vine, and the perfection of its fruit, in this country, is a light rich sandy loam, not more than eighteen inches deep, on a dry bottom of gravel or rock. No subsoil can possess too great a quantity of those materials; for the roots of the vine run with eagerness into all the clefts, crevices, and openings in which such subsoils abound.

In these dry and warm situations the fibrous extremities pushing themselves with the greatest avidity, and continually branching out in every possible direction, lie secure from that excess of moisture which frequently accumulates in more compact soil.

It may hence be inferred, that vines will not flourish in a cold wet soil, nor in one composed of a stiff heavy clay. In preparing the border then, the first thing is to secure a dry bottom. If the soil and subsoil be naturally such as described above, as most congenial to the growth of the vine, nothing more is required than to trench the ground three feet deep, and two feet wide, and place in the bottom of the trench six inches of bones, horns or hoofs; clean it of all weeds, and it will be in a proper state to receive the vines. The trench should incline a little, to carry of the surplus water.

Manures.—As a border in which vines are to be planted ought never to be disturbed after having been once properly made, it follows that those manures that can be applied with advantage to promote their growth, comprehend—first, such as can be mixed and incorporated with the soil at the formation of the border, and which add to its fertility from time to time, according to the respective periods of their decomposition, and amalgamation with it; and secondly, such as can be applied in a liquid state or otherwise as a top-dressing at any subsequent period. Of those manures, therefore, that may be mixed with the soil when the border is first made, the best are such as possess the two valuable qualities of affording to the roots of the vine, the highest degree of nourishment combined with the greatest permanency of duration. Of this description are bones, horns and hoofs of cattle. Every variety of size may be procured from the smallest bone of a fowl, to the largest bone of an ox. For the purpose of top-dressing, soap-suds should be used as fresh as possible, in order that their good qualities may be preserved entire.

Planting.—The best time of the year to transplant a vine is immediately after the fall of the leaf. The ground in which it is to be planted must be prepared agreeably to the directions given above; this being done dig a hole for the reception of the vine about two feet deep, and of the same width and length; and if, after the plant is taken up, its roots should prove too long for this, the size of the hole must be increased, as, on no account must the roots be crippled in their extension.

Loosen the sides and bottom of the hole, and to the soil that is taken out, add a couple of spits of well rotten dung, and mix the whole well together, making it very fine. Put the mould into the hole again to within nine inches of the top, and it will be ready to receive the vine. This must now be carefully taken up, with its roots as entire as possible, and if any of them be bruised or in any way injured, they must be pruned back to the sound parts. Fix the vine in the hole with its stem about six inches from the wall, and let the bottom bud be just even with the surface of the ground. Spread the roots out in a horizontal direction, at equal distances from each other, and in a similar manner to the spokes of a fan, then fill the hole with the mould nearly to the top. Take hold of the stem and drawing it upwards a little, give it two or three shakes with the hand, that the mould may settle well around the roots; after which fill

up the hole with the remainder of the mould; cut the vine down to the two bottom buds, and the operation will be completed.

In the fall of 1855, I bought of Wm. Course, grape plants two years old, at twenty-five cents each, and planted them in borders prepared as described, and cut them down to the second bud from the ground. In 1856 I pinched of all the fruit on first appearance, and in the fall cut them back to about seven feet. In 1857 allowed them to bear about ten bunches each, and in the fall, cut away about one-half the new wood.

This year (1858) I have sold the grapes of five vines for $15 (each vine occupying 8 feet each way, making 64 feet) which is equal to $2,041,87½ per acre, per annum.

CLOVER.

Clover has an importance to farmers which can scarcely be over-estimated, and we fear it does not receive a sufficient consideration. As furnishing a large amount of excellent pasture and fodder for domestic animals, and as a means of keeping up the fertility of our farms when ploughed under, it deserves a prominent place in the system of rotation adopted by those who follow either a mixed or a grain growing husbandry. As a general rule every acre of winter grain should be "seeded down," as it is termed, to clover in the spring, to remain for at least one, and not more than three years as a meadow pasture.

The soil best adapted to the clover plant is that of a somewhat clayey character—such as will produce the best wheat crops. Any soil which will grow wheat will also produce clover. A deep well drained loam suits it well—on all ill-drained soils it suffers much from winter killing, especially if the spring proves one of little snow and variable temperature. On light soils it needs the assistance of manure to prove profitable.

Clover is usually sown early in spring upon winter grains, and occasionally with oats and barley. With the latter it generally does well, especially if sown in good season. Upon wheat we sow in March, when the season is sufficiently advanced to do so. While the light frosts continue, the slight cracking and heaving of the soil through their action, will generally furnish a sufficient covering for the seed, though some recommend sowing later and harrowing in, arguing that this process not only covers the clover more perfectly, but benefits the wheat crop. When seeding with spring grains, it is usually sufficient to pass over with the rollers, sowing the clover seed after the last harrowing.

The benefit which clover derives from plaster seems a "fixed fact in agriculture," not needing special remark in this connection. Hence they have been associated in the minds of most of our farmers as partners in the product desired, and the one usually accompanies the other. We think, however, that the sowing of plaster upon wheat fields seeded to clover is frequently deferred too late. The clover needs its aid, when it first comes up, besides if sown late, the wheat is injured by its causing too rank a growth of straw at the time when the grain is forming. We should sow plaster as early as April, if possible, upon wheat, and upon spring grain seeding as soon as it fairly appeared above the ground.

The amount of seed necessary for an acre depends upon the character of the soil, but there seems no disposition to seed too heavily. Loamy soils need less than clayey, and the growth of the crop with which it is seeded, whether large or small, have considerable influence. A peck to the acre is little enough—some use more, but many less. It is poor economy to sow but half enough to cover the surface—the pasturage and hay are of less value, and the saving of five dollars in seed often entails a loss of five times that amount in the product.

There are many varieties of the clover plant, but those most grown are the common red, or Northern clover, of which we believe there are two varieties—the large, or pea-vine clover and the medium—as it is called, perhaps from its lying between that and the Southern or small variety. The medium kind makes the best hay and is equally valuable as a green manure.

We have already remarked upon the great value of clover for this latter purpose. Some of the reasons why it is so may be thus briefly stated. Clover takes less from the soil and more from the atmosphere, in proportion to the feeding and manuring value of its products, than most other plants. It has numerous roots, long, bulky stalks, and abundant leaves, each supplying vegetable matter to the soil. A luxuriant growth of clover is an excellent preparation for any and every crop. Its far spreading roots loosen and deepen the soil, and bring to their support and to their surface the elements of fertility below the reach of most other crops. This, too, is the reason why clover delights in a deep fresh soil, and why, after subsoil ploughing, it is so certain to succeed.

THE CULTIVATION OF FLAX.

From the Protectionist.

The cultivation of flax seems to meet with very general favor, probably from the fact that many old country farmers are acquainted with the raising and preparing of that article, and there can be no doubt that if the agriculturists of Canada were assured of a steady demand, the cultivation of flax would be largely engaged in.

In the annual address of the Vice-President of the Agricultural Association of Upper Canada, Mr. Fergusson thus spoke of the advantages to be derived from the raising of flax in this Province:

"When we examine the trade and customs' returns of the Province published by the Government, we find that cotton goods, in a variety of forms, are annually introduced into the country, not only from England but from the United States, in such quantities, and of so great an amount in value, as to cause astonishment at our supineness in continuing to encourage a foreign material which draws so heavily upon the industrial resources of the country—the annual importations exceeding five millions of dollars. By substituting for cotton, where practicable, a fabric of our own manufacture composed of flax, to supply us in the many uses to which cotton is applied, a great portion of the very large sum of money would be annually saved to the country, and a new branch of industry created among our people and its manufactures, by means of which a new market would be established for a considerable amount of our surplus provisions, and also profitable employment secured for an increased and thriving population."

Of the importance of the article of flax to the manufacturer, as well as to the agriculturist, Professor Wilson in his able lecture alluded to, showed that at that period, "England had at work 168,000 spindles in its manufactures, while the United States had but 50,000." but were, as he remarked "rapidly increasing." And he adds "that out of twenty millions of yards of linen annually manufactured in England, eight millions had been sent to the American continent," showing thereby the importance to us of encouraging the growth and manufacture of this most useful material. And the learned gentleman, in showing the large amount of foreign raw flax used, further says, "that for the production of the quantity of raw material annually imported into England, it requires the growth of 800,000 acres of land.

It is ascertained that the flax plant will grow to perfection where cereal crops can be cultivated; and with even less exhausting effects to the soil than that of wheat; but the apparent difficulty to the grower, is the want of necessary modern machinery for producing the putrefactive fermentations, or rotting process; which might be of such construction as to be capable of removal from place to place, as most of our threshing machines are, and by which means the raw material could be cheaply prepared for the manufacturer.

Should its manufacture into the finer and more costly articles of commerce, not be obtainable at present, for want of enterprising capitalists among us, or through a deficiency of labor, by proper encouragement given to flax culture for export only—now that we have ocean steamers coming to our very doors—a new opening for the enterprise of our people presents itself, which would be found more remunerative than the growing of wheat under the present circumstances; and its adaptability for exportation when merely rough dressed or scutched, and being much less liable to injury in its transport across the seas than cereal crops, gives it a decided advantage for ocean transit.

In estimating the comparative advantages over the many other productions of the field, that those obtain who are engaged in the cultivation of flax as a staple, many instances might be adduced, but the following statement from the *Irish Farmers' and Gardeners' Magazine*, shows the fact to be indisputable:

A Mr. Woltenhohen sowed in the month of April fifteen Irish acres with Dutch flax seed. These fifteen acres produced 245 bushels of excellent seed, or 23 bushels per acre, worth 7s. 6d. per bushel	£129	7	6
He had of scutched flax, 6 tons 11 cwt. 1 qr., or 1050 stones of 14 lb., each worth 7s. 6d.	393	15	0
Making in all	£522	2	6
Or per acre	£ 34	7	6

It may not be out of place to mention here, that Ulster, the most northerly of the four provinces of Ireland, still maintains by its flax and linen trade a population exceeding two millions, notwithstanding the very large numbers who have emigrated from that section of the country.

Among the many causes why the Canadian farmer could make not only the growth of flax, but also its manufacture into linen profitable, we have the certainty of four months' winter, during which period very liitle out-door occupation engages the time of the farmer and his family. This season of the year could be profitably employed in preparing the raw material for the manufacturer, and where it might be deemed advisable to use the hand loom at home, what more fitting season for such employment than our dreary winter's days and evenings, where by the comfortable hearth, the busy hum of the spinning-wheel, and the lively motion of the weaver's shuttle, would, besides the pecuniary advantages it would bring, give life and animation to that season of the year when the out-door world presents but a dreary sameness, and the vegetable kingdom seems touched with the finger of death.

If in her future destiny Canada expects to succeed in maintaining a self-sustaining position, when brought into competition with those of the extensive wheat growing prairie lands of the western region, aided as they soon will be with all the modern appliances of steam ploughs now being so effectually used in England, (and certainly well adapted to the prairie country,) she must eventually look to the resources which her magnificent water powers present for manufacturing purposes, and bring them into use as auxiliaries towards maintaining her progress and position among the surrounding state and colonies.'

The people of Canada owe Mr. Ferguson a debt of gratitude, for this bold and fearless exposition of his views, in favor of encouraging the home industry of the country. There still remains the question, where shall the farmers find a certain and profitable market for the flax and flax seed thus shown to be so profitable in Ireland? At present our farmers raise a little lint for the seed, and leave the flax to rot, or send it to the paper mill. With this prospect before them, we fear it will be impossible to induce any considerable number ot agriculturists to abandon the raising of wheat for the cultivation of an article, for which there is little prospect of finding a market. The great object to be attained is a ready market, at remunerative prices, for every stone of flax offered for sale. Were its cultivation once established, capital would be attracted for the purchase of both the flax and seed; but something must be done at the outset. At the risk of being charged with a desire to return to the bounty system, we would propose a plan by which the Government might encourage the growth of flax without expense to themselves and with manifest advantage to the country. Let the Government establish warehouses in Quebec, Montreal, Kingston, Toronto, and London, for the receipt of flax, and appoint well qualified persons to receive and examine the same, and to grant receipts for the quantity delivered, describing the quality according to a scale to be agreed upon.

These receipts to state the quantity and quality of the flax, to be payable six months after date at the current price of flax, less a certain per centage for freight and commission, &c., and to be negotiable instruments passed from hand to hand without endorsement. They would thus obtain at once a money value, while the flax could be shipped in bond and sold by an agent in the British markets. This could be equally

well performed by a private company, but in that case, the receipts would not be available to the farmers so readily as if they had the guarantee of the Government.

From the calculation of Mr. Bouchette as given above, there is no doubt that the export of hemp and flax (as both might be afforded the same advantage,) would soon reach $10,000,000 per annum, without materially decreasing the exports of wheat and flour. To promote the cultivation of these articles it has been suggested, that a model farm should be purchased by Government, where the capabilities of soil might be tested, and the best methods of cultivation made known. We are free to admit that such establishments have, as a general rule, proved utter failures, and their introduction here would be a very questionable policy. The publication of a simple essay on the culture and preparation of hemp and flax, and a reward offered for the best portable flax mill would probably do more to forward the objects in view than ten thousand pounds expended by a few costly *experimenters*, who might possibly think it a matter of vast importance that the simple farmers of our back townships should know the Latin and German names of the various products of the farm.

OILING HARNESS.

We find in the *New England Farmer* a valuable communication from Mr. J. Hart, of Portsmouth, N. H., in which he gives his method of cleansing, colouring, and oiling harness, which we think may be of use to our readers, so we publish it:—

We all know that it is a great benefit to oil our harness, yet many of us neglect to do it, because we regard it as a dirty job, but it is easy enough if done right. My process for doing it is as follows: 1st. I take the harness apart, having each strap and piece by itself, then I wash it in warm soap-suds. I used to soak it in cold water for half a day, as others did, but I found that warm water does not injure the harness and facilitates the job. When cleaned, I black every part with a harmless black dye, which I make thus: One ounce of logwood, twelve grains bichromate of potash both pounded fine; upon that I pour two quarts of boiling rain water, stirring until all is dissolved. When cool it may be used. I keep it on hand all the time in bottles. It may be applied with a shoe brush or anything else convenient. If any one objects to the use of this blacking, fearing that the bichromate of potash it contains would injure the leather, I would just say that this kind of potash will not injure leather, even when used in a much larger proportion. The blacking generally used contains copperas—a sulphate sometimes made of oil of vitrol and iron, and it will eat out the life of leather, unless used with great caution. When the dye has struck in, I go through with the oiling process; some have a sheet iron pan to oil in, which is better than any thing, but I have a sheet of iron nailed to a board, about two or three feet square. This I put on a table, and lay a piece or part of the harness upon it, and with neats-foot oil applied with a paint brush kept for the purpose, I go over it, oiling every part, and thus proceed until every part is oiled. The traces, breeching, and such parts as need oil most, I oil again. For the last oiling I use one-third castor oil and two-thirds neats-foot oil, mixed. A few hours after, or perhaps the next day, I wipe the harness over with a woollen cloth, which gives it a glossy appearance. Why I use castor-oil for the last coat is, because it will stand the effect of the atmosphere, the rain, &c., much longer than neats-foot oil, consequently the harness does not require oiling so often by its use. One pint of oil is sufficient for one set of harness.

The common way of oiling harness, is to apply as much neats-foot oil containing lampblack as the leather will take up, then washing off with castile soap and water. This way is not so good as mine, because it makes the harness smutty, and also, the soap that is used contains barilla, a strong alkali, which cuts up and feeds upon the oil in the leather, and weather, especially if rainy, soon renders the harness stiff and unyielding as before; the wax in the thread is also destroyed and the stitching gives way. I have experimented with different kinds of oil, and find that the kind and the process I now use is the best.

NIGHT-AIR.

During the months of September and October, throughout the United States, wherever there are chills, and fever and ague, intermittents, or the more deadly forms of fever, it is a pernicious, and even dangerous practice, to sleep with the outer doors and windows open; because miasm, marsh emanations, the product of decaying vegetation—all of which are different terms, expressing the same thing—is made so light by heat, that it ascends at once towards the upper portion of atmospheric space, and is not breathed during the heat of the day, but the cool nights of the Fall of the year condense it, make it heavy, and it settles on the ground, is breathed into the lungs, incorporated into the blood, and if in its concentrated form, as in certain localities near Rome, it causes sickness and death within a few hours. The plagues which devastated Eastern countries in earlier ages, were caused by the concentrated emanations from marshy localities, or districts of decaying vegetation; and the common observation of the higher class of people was, that those who occuped the upper stories, not even coming down stairs for market supplies, but drew them up by ropes attached to baskets, had entire immunity from disease, for two reasons, the higher the abode, the less compact is the deadly atmosphere, besides, the higher rooms in a house, in summer, are the warmer ones, and the miasm less concentrated. The lower rooms are colder, making the air more dense. So, by keeping all outer doors and windows closed, especially the lower ones, the building is less cool and comfortable, but it excludes the infectious air, while its warmth sends what enters through the crevices immediately to the ceilings of the rooms where it congregates, and is not breathed; hence is it that men who entered the bar-room and dining-saloons of the National Hotel, remaining but a few brief hours, were attacked with the National Hotel Disease, while ladies who occupied upper rooms, where constant fires were burning, escaped attack, although remaining in the house for weeks at a time. It was for the same reason that Dr. Rush was accustomed to advise families in the summer-time, not being able to leave the city, to cause their younger children especially, to spend their time above stairs. We have spent a lifetime ourselves in the West and extreme South, and know in our own person, and as to those who had firmness to follow our recommendation, that whole families will escape all the forms of Fall fevers who will have bright fires kindled at sunrise and sunset in the family room. But it is too plain a prescription to secure observance in more than one family in one thousand. After the third frost, and until the Fall of the next year, it is an important means of health for persons to sleep with an outer door or window partly open, having the bed in such a position as to be protected from a draught of air. We advise that no person should go to work or take exercise in the morning on an empty stomach; but if it is stimulated to action by a cup of coffee, or a crust of bread, or apple, or orange, exercise can be taken, not only with impunity, but to high advantage in all chill and fever localities.—*Hall's Journal of Health.*

INAUGURATION OF THE STATUE OF SIR ISAAC NEWTON, AT GRANTHAM.

To our great and immortal Newton, the philosopher, and the christian, another memento of a nation's grateful homage has just been paid, and Grantham, in Lincolnshire, the seat of Newton's early studies, stands proudly pre-eminent for being the site chosen for such tribute. The ceremony of inaugurating the statue recently took place, and a most interesting spectacle it was, a procession issuing from the Grammar school in which the philosopher received that instruction, and in which he himself fostered that talent which have since shed light on all the civilized world. The procession was headed by the Mayor and civic authorities, the Bishop of the Diocese, Lord Brougham, &c. As soon as the venerable nobleman had taken his seat, in the actual chair in which Sir Isaac Newton was wont to sit while composing his "Principia," the statue was denuded of its covering, and Lord Brougham, in an elaborate speech, gave evidence that neither his own mental powers were on the wane, nor was the enthusiasm with which he alluded to the unrivalled endowments of mind of the great philosopher, aught but that

which springs from a soul thoroughly impressed with the undisputed worth of the object of his eulogy. It is pleasing, after the lapse of nearly two centuries, to find so noble a testimony to the memory of him, whose researches and learning have done more to unfold the mysteries of the solar system than any other human being—whose perceptions of the laws of nature have cleared a path through which men of the present generation can wander with delight. The name of Sir Isaac Newton never could die; it is enrolled in the movement of every star, and is stamped on every calculation relating to art or science. A people's tribute to a deceased warrior or a departed statesman bespeaks a noble spirit; but there is a something indescribable in the pleasure with which one must view the proceedings at Grantham. There, neither warrior nor statesman was the theme of praise, but thousands of an after-generation met to do homage to the memory of the profound scholar and the humble christian. Nor was the circumstance less interesting from the fact of one of our deepest mathematicians of the present day—Henry Lord Brougham, standing there, in the 80th year of his age, paying tribute to the departed philosopher in a speech worthy of the finest orators whose names Greece and Rome have handed down to us. At that age, too, this man of varied attainments, who has devoted a whole life for the wide spreading of knowledge and for the advancement of science—now, (it is affirmed) filling up his leisure time by preparing a new edition of the "Principia"—all this added interest to a scene, in itself most gratifying; and Grantham must long remember with pride the day, when, on St. Peter's Hill, the statue of Newton was inaugurated by the greatest philosopher and statesman of the present day.—*English Paper.*

SEVEN REASONS FOR HAVING A SMALL HOUSE.

It is often remarked by strangers that Pennsylvanians build large barns to the discredit of their small houses, much of which is true, but I apprehend that it is not the want of size in their houses, so much as the want of comfort and convenience that should be animadverted upon. We confess to a liking for small houses and small women. Touching the former, we will here give seven good, and as we think, sufficient reasons for our preference. In the first place, they imply small, cozy rooms. Not cramped, but mensurable. So small that the light and heat are reflected and radiated from all parts. Family comfort cannot thrive in a hall or a field. I imagine that the boy who did not feel sufficiently acquainted with his father to ask him for a new cap, lived in "a palatial residence." I doubt not, for the same reason, people living among mountains are more sociable than those who live on plains. Affection, like a smile, dies unless it is reflected. *Secondly,* We like small houses because they look paid for, and a small house paid for holds more happiness and real friends than a large one unpaid. Anything unpaid is uncomfortable. To an honest man debts are demons, and an indebted house a haunted house full of creeping horrors and disquietudes as that described by Hood. *Thirdly,* We like small houses because they look sympathizing. They are like people not overdressed, more ready to make acquaintance. A big house is like a big man—unaccostable. Stately porticos and lordly halls are like the titles D. D., LL.D., &c.—imposing, distant, and inclined to be repellent. In the *fourth* place, we like a small house because it excites no envy. It matters not how elegantly it is furnished, how tastefully surrounded and adorned by shrubbery and flowers, its observers are its admirers and friends. It does not fall under the "evil eye," and no man who has a soul would wish even his house—his home—the abode of his wife and children, to be an object of envy. Every body can say, and is encouraged to say, "I can build such a house"—which words are equivalent to a blessing. *Fifthly,* We like a small house because it must always remain the people's house. The industrious mechanic can earn such a house. The diligent laborer can own, by patient industry, such a house. The widow can live in such a house, and what a rich, rational comfort it is to live in such accommodations as of necessity must be the dwelling-place of nine-tenths of the race. *Sixthly,* We like small houses, because in such most of us begin life. It is with small houses that the affections of young couples, the first cares and joys of married life, are mostly associated. Most of us begin "in a small way." In the last place, we prefer the small house, because it is not so far removed from our last narrow home. Only a few steps down and our weary feet are there, but from the large palace to the narrow grave the change is too abrupt. I've grown sober over these orders of architecture, and will stop.—*Farmer Boy in Ohio Farmer.*

QUALITY OF BEEF.

The Yankees generally seem to think that all beef is alike—varying only in regard to the age of the animal slaughtered, and characterised by the terms *tough or tender*.

John Bull understands the nature of beef better. He not only knows that there is a difference in the quality of beef in individuals of the same breed, and he has a faculty of discriminating by his thumb and finger, or by touch, but he also knows that the different breeds, supposing them to be fattened by the same material, are very different indeed in their qualities.

At the last international fat cattle show, in Paris, the judges on beef had specimens from each of the competing breeds brought to the table *roasted*, where they performed their agreeable labors in a very quiet and satisfactory manner. The result of their deliberations was as follows:—

First	quality	to the	West Highland Ox.
Second	"	"	Devon Ox.
Third	"	"	French Ox.
Fourth	"	"	Short Horn and Angus Ox.*
Fifth	"	"	Angus (Scotch) Ox.
Sixth	"	"	French Ox.
Seventh	"	"	Short Horn (English) Ox.
Eighth	"	"	French Ox.

So much for the roasted. For soups and boiled beef, they gave the preference to the Short Horn, (English.)

We have been urging the raising of Scotch (Galloway) cattle for beef, in preference to some of the larger breeds. The quality of the beef of this breed is superior—but our Yankee brethren laugh at them, thinking that it is the *pile* of beef which the animal makes, and not the *quality*, which should be the main objest. We go in for quality and fair size, rather than quantity and poor quality.

HOW TO EXTERMINATE THE WEEVIL.

J. L. Booth, now of New York, who has made some valuable improvements in grain cleaning machinery for flour mills, sends us the results of some experiments with his machine for scouring grain. He obtained from a farmer thirty bushels of wheat from a bin of two hundred bushels, and after passing it through the machine, placing glass jar samples of the cleaned and uncleaned. Upon examination some time after, he found the latter alive with weevil and badly eaten, while that which had been scoured was perfectly free from any appearance of the insect. This led him to a microscopic examination of the berry of wheat, which resulted in convincing him that any grain infested with weevil can be entirely cured and preserved by the simple process of cleaning. In proof of which he states that a large portion of the grain seemed to have a single blister or slight prominence upon the germinating end of the berry, which was readily removed by the point of a knife, and the egg of the weevil discoverd. Mr. Booth is satisfied that this thorough scouring and agitation of the grain removes the glutenous covering of the cell containing the egg, and that its exposure to the air destroys its generating properties. And if the wheat is taken in any condition, after this insect has passed into the larva or perfect state, and treated as above mentioned with any effective smutter, this pest will be completely eradicated. There are other species of the same destroyer—one in which the egg is deposited in the berry while in a soft state before harvest, and the depository being capped over to exclude the air, the egg remains thus protected until the grain is again sown, and does not change until decomposition commences from the action of the earth and process of germination. Many ineffectual attempts to find a remedy have been made. As Mr. Booth's process is within the reach of all, it is worth the while of those whose grain is infested by the weevil to try it.—*N. Y. Evening Post.*

The above, of course refers to the insect which attacks wheat in the granary, scarcely, if at all, yet known in Canada.

* A Scotch cross.

BISCUIT FODDER.

This is the name given by M. Naudin, a veterinary surgeon of the Imperial Guard, to a preparation of his invention, which has already been successfully tried in some cavalry barracks, and would seem, besides other advantages, to solve the problem which at present engrosses the attention of the agricultural world, namely, a sufficient supply of fodder for cattle in times of scarcity occasioned by drought. This biscuit fodder is composed of all kinds of substances generally given to horses and cattle—such as straw, hay, clover, oats, barley, peas, etc. To these may be added many others, such as the refuse of the wine-press, the pulp of various roots, the stalks of millet and maize, the leaves of the vine, the beet-root, and of certain trees, the sweepings of the barn and hayloft, which contain a vast quantity of nutritious matter in the flowers and seeds of hay, etc., which are generally thrown away. All these ingredients are bruised and chopped together; a mucilage of barley-flower is then added, with a little salt, and the mixture is then left to itself for a few hours until a slight fermentation has set in, when it is put into square moulds, made into cakes, and left to dry in a current of warm air. In this state it may be preserved for a great length of time. When it is to be used, it is moistened with about one-fifth of its weight of water; each cake is broken into seven or eight pieces, and put into the manger or nose-bag, as the case may be. The cakes should weigh about a pound each; twenty cakes of that weight are sufficient for the daily ration of a horse. The advantages which this preparation offers are evident; mastication and digestion are rendered easier, and therefore the general health of the animal is ensured. A sufficiency of fodder can be laid in store for the winter; the rearing of cattle need not be checked for want of food, and the waste occasioned by the animals themselves while they eat at the manger, letting half their allowance fall on the floor of the stable is obviated. The cab-horse, which eats its hay on the cab-stand, often soiled with mud and filth, will find in the biscuit fodder a clean and wholesome aliment; horses conveyed on railways, and especially on board ship, can be easily fed, the stowage of a sufficient quantity of these cakes for a long voyage taking up but little space, while all danger of fire and spontaneous combustion, of so frequent an occurrence in haylofts, is completely obviated. Lastly, these cakes may be used as convenient vehicles for any kind of drugs which it may be necessary to administer.

THE ANTHRACITE COAL TRADE.

Thirty-one years ago the first coal went to Philadelphia, being ten wagon loads, hauled over the mountains by George Shoemaker, of Pottsville. Very few persons could be induced to purchase it, and most of these were wholly unsuccessful in their attempt to make it burn. Everybody considered it a mere stone. Mr. Shoemaker was denounced in all quarters as a cheat, and measures were being taken to arrest him for swindling, but he escaped arrest by leaving the city by a circuitous road, and did not stop until he had got thirty miles on his homeward journey. The most remarkable feature in this extraordinary speculation was, that Mr. Shoemaker did not himself know how to make the coal burn. He was therefore unable to convince the public that it really would ignite. Had he experimented at home, and brought with him a grate or stove in which to kindle a successful fire, the exhibition would have, no doubt, hastened full ten years the development of the coal business. He reached home disgusted at the belligerent temper of the citizens, and heart-sick at the ill success of his adventure. His reputation as an honest man was rescued, however, by an iron master in Delaware county, into whose hands some of the repudiated mineral accidentally fell. He tried the coal, caused it to burn freely with an intense heat, and was so pleased with it that he proclaimed the fact in the newspapers. This led others to try, and they also succeeded. The prejudice was removed, and consumption went on from this disastrous beginning, until it at last reached the enormous quantity of 3,479,862 tons. But up to this date the depression of manufacturing has caused a reduction of 300,000 tons to be sent to market, and the whole year undoubtedly shows a falling off full 600,000 tons.—*Miner's Journal.*

THE

Canadian Agriculturist,

AND

JOURNAL OF THE BOARD OF AGRICULTURE

OF UPPER CANADA.

VOL. X. TORONTO, DECEMBER, 1858. No. 12.

CLOSE OF THE YEAR.

The present number completes the tenth volume of the *Agriculturist.* In consequence of the publication of the monthly parts having got behind before the transfer of the work from the late Proprietor to the Board was finally determined upon, its subsequent issues have, in point of time, been retarded; not so much, however, as to prevent the current volume being completed within the year. The *Transactions*, however, cannot be brought to a conclusion for 1858, with the present number, as additional matter is still on hand, and more time is required, than was anticipated, to procure the completion of the cuts and illustrations relative to the late Provincial Exhibition. The remaining sheets necessary for completing the volume of *Transactions* for the current year will be mailed to each of our subscribers, now on the books, as speedily as possible. Separate title pages and indices will be prepared for the *Agriculturist* and *Transactions*, so that they may be bound separately or together, at the option of the subscribers.

In reference to the future, we have the pleasure of announcing that a new and much improved series of this periodical will be commenced in January next, and that it will regularly appear hereafter, on the 1st of each month. Every effort will be made to improve both the mechanical execution and literary character of the work. The price to single subscribers will be $1 per annum, but to agricultural societies or clubs, the former rate of *half-a-dollar*, will be continued. The size of the monthly parts will probably vary, according to the amount of official matter on hand; but each number, including the *Transactions of the Board of Agriculture*, will consist of not less than 48 pages; thus making an annual volume of from 600 to 700 pages, for the unprecedented low charge of only *fifty cents!*

The great objects of this Journal being to record, in a condensed and popular form, the most important agricultural improvements of the day, and to offer a regular means of communication between the Board and the various agricultural societies throughout this section of the Province, it must be obvious that, in carrying out these purposes, we shall require the co-operation of those individuals who take a lead in such matters in different parts of the country. We trust that this kind of assistance will not be withheld. Any information, or suggestions, tending to facilitate these objects, will at all times be thankfully received.

We cannot conclude these few remarks, written at the close of a year which has proved so widely disastrous to the agricultural and trading interests of the country, without expressing a strong hope that the worst is past, and that the new year will, under the guidance of a beneficent Providence, be characterised by increased activity in all our industrial pursuits and the full restoration of commercial confidence; an abundant harvest, and, as a consequence, general prosperity and happiness.

AMERICAN SHORT HORN HERD BOOK.

[The following communication from Lewis F. Allen, Esq., Editor of the *American Herd Book*, in reference to his forthcoming new volume (the 4th of the series) would have appeared at an earlier date, had it not unfortunately got mislaid. It may not even now be too late to order the pedigrees of animals, if parties desirous of so doing communicate with Mr. Allen immediately. The work is highly deserving the support of all short-horn breeders, and indeed of all farmers interested in that important breed of stock, (and who now-a-days is not?) throughout this continent.]—Ed. Agriculturist.

Black Rock, N. Y., October 8, 1858.

Editor Canadian Agriculturist.

Dear Sir,—The approbation with which the previous volumes of the American Herd Book have been received by the Short Horn breeders of this country, together with the large contribution of pedigrees to their pages, and the solicitations of many breeders to have a fourth volume in preparation, have induced me to give this notice, that sufficient time may be given for the full examination which is required by every Short Horn breeder to properly arrange their pedigrees. Since the compilation of the last volume, hundreds of young animals have been produced, and new importations made from abroad; and by the time the next volume can be ready for the press, a further natural increase to our existing herds will be added. I therefore give you this notice, that in case you choose to record your pedigrees, you can have ample time to do so. I ask your attention to the following particulars:

1st. All pedigrees must be sent in previous to the *first day of December*, 1858, to allow me time to compile them, and issue the book by May 1, 1859.

2nd. Every pedigree must be made out at *full length*, after the manner of those in the volumes of the American Herd Book, as I can not encounter the labor and responsibility of making out full pedigrees from short notes, hints and memorandums. The imperfect condition of many private records required me to do that labor for my previous volumes, which it is now unnecessary to repeat, with such extensive authorities as those volumes before you will afford. I can not, therefore, accept such imperfect papers, only in cases where your animals or their ancestors have not been previously recorded, either in the English or American Herd Books. Another reason for this is, that every breeder ought to be supposed to understand the lineage of his stock better than a stranger, and consequently he can give their pedigrees with greater accuracy.

3rd. *Let every individual pedigree be complete in itself*, like those in the published Herd Books. State by whom the animal was bred, (if you wish that fact known;) the date (by month and year) of its birth; the name and Post Office, (County and State,;) residence of its present owner; its sex, (this may merely say "Bull" or "Cow," in parentheses, by the side of the animal's name;) the color, whether white, red, red and white, red roan, light roan, or roan, simply without qualification. In roans, where white is the prevailing color, they are *light* roans; where red prevails over the white, they are *red* roans. By referring to the past volumes of the Herd Book, you cannot mistake the mode of description, or the tabling the produce of the cows. Do not send me *printed* pedigrees from newspapers, hand-bills, or catalogues, &c., unless they are in Herd-book form, and complete; nor when they are printed on both sides of the paper, as, if so, they must be copied by me for the printers. The names of bulls occurring as sires in the pedigrees, may be referred to by their numbers when recorded in the Herd-books, either English or American. When such bulls are not recorded, let their pedigrees be written and referred to *distinctly* under the pedigree to which he is a party. Any unrecorded and unnumbered bull referred to in a pedigree must also be numbered and recorded to properly elucidate such pedigree, and a charge of fifty cents will be made for such bull or bulls. In cases where uncommon labor is necessary for me to find out the pedigree, an additional charge of fifty cents to a dollar each will be made, of which the owner of the animal will be notified at the time.

4th. Every animal presented for record must be *well-bred;* and where evidence of the fact cannot be traced to animals recorded in an existing Herd Book, *documentary* evidence must be furnished to sustain the fact that they are *true* Short Horns, and are descended from well authenticated Herd-book animals.

5th. Fifty cents will be charged for each animal recorded in a distinct pedigree by name, excepting the animals named in the tables of produce of recorded cows. The record fee, in current money at your place, to be remitted when the pedigrees are sent to me. *In all cases where a pedigree, for insufficiency, cannot be recorded, such pedigree will be sent back, if requested, and the fee returned.*

6th. In making out your pedigrees, *write only on one side* of the paper.—Write legibly, and with perfect *distinctness*, all *proper* names, as without such writing, many names can only be *guessed* at, and important mistakes may occur. Let your lines be quite half an inch apart, and between each pedigree let there be a space of at least two inches blank paper. When pedigrees are written on *both sides* of the paper, *they will be immediately returned*, as one of them must, in all cases, be copied in order to print them.

7th. If any extraordinary quality of milking, in accurate weights or measures, and times, belong to your cows, or of dead weights of carcases in slaughtered

recorded animals, have been made, they may be noticed; as we claim that the Short Horns are the greatest milkers, and the heaviest beef, of any neat cattle whatever, and such instances carry proof of these facts to the public.

8th. If there have been any errors or omissions in the pedigrees of your animals already recorded, by my fault, please correct them and send them to me, and I will rectify them in proper order in the fourth volume, by name and reference, without charge.

9th. I will print any number of well-drawn, accurate portraits of animals, for the fourth volume, at five dollars each for the whole edition of the book; the portraits and cuts to be furnished by the owners. This will be done on the best of fine *tinted* paper. I cannot print portraits without charge, as the expense is too heavy an outlay for me, and the main benefit accrues to the proprietors of such animals. In this relation, I am authorized by Mr. John R. Page, a good artist, whose address is Sennett, Cayuga Co., N. Y., to state that he will proceed to take such portraits, whenever a sufficient number can be furnished to justify it, and that he will superintend the engraving of them by competent workmen. Many portraits in the second and third volumes are samples of his execution. All persons who contemplate giving portraits of their cattle, should lose no time in obtaining them at once, that there may be ample time to have them properly engraved.

10th. The price of the book to contributors and subscribers, will be the same as the last—five dollars a copy—payable on ordering it for delivery. The work to be the same in style and material as the third volume.

11th. If you have sold unrecorded animals to any breeders whose names are not in the third volume, I will thank you to send me their names, that I may send them a copy of this circular, as it is of advantage to you to let animals of your breeding, now in other hands, be recorded and known to the public.

12th. I suggest that even in cases where you record by name the *produce* of your cows, it is still better to give all such produce a distinct record of their own. They become thus more conspicuous, as such produce merely recorded with the cow is not much looked after by inquirers,—the chief advantage in the produce tables being to show that the *cow*, whose progeny is so recorded, is a successful breeder. This separate record will add an item to the expense, but it is a trifle compared with the value of an animal worth from one hundred to five hundred or a thousand dollars. Address me at Black Rock, N. Y.

Respectfully yours,

LEWIS F. ALLEN,
Editor American Herd Book.

Familiar Robin.—In the garden of the Laurels, at Clewr, near Windsor, a robin comes every day, when called, to be fed. He will perch himself on the hand of the lady of the house, and take his meal without displaying the slightest symptom of fear. Frequently he has flown across the garden, and has taken bread out of her mouth. When satisfied, he perches himself either upon the bench near his mistress, or upon the nearest bough, and sings his song. In no instance has he refused to be fed, or neglected the usual call for him. The little fellow has never been caught or confined, but is in his natural state.—*Cottage Gardener.*

MISCELLANEOUS.

Enjoyments of Winter.—Awed by the progress of time, winter, ushered into existence by the howling of storms and the rushing of impetuous torrents, and contemplating with the satisfaction of a giant the ruins of the year, still affords ample food for enjoyment which the vulgar never dream of, if sympathy and association diffuse their attractive spells around us. In the bosom of retirement, how delightful is it to feel exempt from the mean intrigues, the endless difficulties and tumults, which active life ensures, and which retirement enables us so well to contemplate through the telescope of recollection! When seated by the cheerful fire among friends, loving and beloved, our hopes, our wishes, and our pleasures are concentrated; the soul seems imparadised in an enchanted circle; and the world—vain, idle, and offensive as it is—presents nothing to the judgment, and little to the imagination, that can induce the enlightened or good to regret that the knowledge they possess of it is chiefly from the report of others, or from the tumultuous murmur which from a distance, invades the tranquility of their retreat, and operates as a discord in a soft sonata. These are the moments which affect us more than all the harmony of Italy or all the melody of Scotland; moments in which we appear almost to emulate the gods in happiness.—*Bucke's Beauties of Nature.*

Cure for Shying.—If a lady's horse be addicted to shying, I will give her a sure and simple cure for the same; one which I have never known to fail. Let us, for instance, suppose the existence, of a heap of stones on the near side of the road. The horse sees an indistinct grey object, and prepares to shy at it. The moment he shows such symptoms, let his fair rider turn both her eyes on exactly the opposite side of the road, and look steadily away from the offending heap, and I'll engage that the horse will walk quietly by. For many years I have ridden horses of all tempers and dispositions, some of them much given to shying, and have never yet found this simple remedy to fail in its effect. Let those who scoff at me try it. The reason is this: The human eye has, doubtless, a great influence on all animals, and there is a strong and secret sympathy between the horse and his rider. The horse sees an indistinct object, and looks doubtfully at it; his rider becomes alarmed, imagining that the animal is going to commit some eccentricity; the fear is communicated to the animal, and he starts in terror from the object which has frightened him; whereas, if he finds that his rider sits unmoved and unconcernedly, he regains his confidence, and goes on "in the even tenor of his way." I believe that one-half of our horses are ruined for life by being "hit over the head" by grooms to cure them of shying.—*Horse Taming.*

Peach Raising in Ohio.—The Ohio *Cultivator* says that the Brothers Loughry, of Adams county in that State, raised the present season 3600 bushels of peaches, which they sold in the Cincinnati market at an average of three dollars per bushel, amounting to $10,000; which, after deducting the expenses of gathering and marketing, leaves a net profit of $9.000. This crop was obtained from about ten acres.

Daily Duties.—My morning haunts are where they should be, at home! not sleeping, nor correcting the surfeits of an irregular feast, but up and stirring; in winter, often ere the sound of any bell awakes men to labour or to devotion; in summer, as oft with the bird that first rises, or not much tardier, to read good authors, or to cause them to be read, till the attention be weary or memory have its freight; then with useful and generous labour preserving the body's health and hardiness, to render lightsome, clear, and not lumpish obedience to the mind, to the cause of religion, and our country's liberty.—*Milton.*

THE GARDEN.—The Garden is a bound volume of agricultural life written in poetry. In it the farmer and his family set the great industries of the plow, spade, and hoe, in rhyme. Every flower or fruit bearing tree is a green syllable after the graceful type and curse of Eden. Every bed of flowers is an acrostic to Nature, written in the illustrated capitals of her own alphabet. Every bed of beets, celery, or savory roots or bulbs, is a page of blank verse, full of the *belles lettres* of agriculture. The farmer may be seen in his garden. It contains the synopsis of his character in letters that may be read across the road. The barometer hung by his door will indicate certain facts about the weather, but the garden lying on the sunny side of the house, will mark, with greater precision, the degree of mind heart culture which he has reached. It will embody and reflect his tastes, the bent and bias of his perceptions of grace and beauty. In it he holds up the mirror of his inner life to all who pass; and, with an observant eye, they may see all the features of his intellectual being in it. In that choice rood of earth he records his progress in mental cultivation and professional experience. In it he marks, by some intelligent sign, his scientific and successful economies in the corn field. In it you may see the germs of his reading, and can almost tell the number and nature of his books. In it he will reproduce the seed-thoughts he has culled from the printed pages of his library. In it he will post an answer to the question whether he has any taste for reading at all. Many a nominal farmer's house has been passed by the book agent without a call, because he saw a blunt bruff negative to the question in the garden or yard.—*Elihu Burritt.*

THE EMPEROR NAPOLEON AS A FARMER.—On Saturday the Emperor of the French, accompanied by Marshal Canrobert, Generals Ney and Fleury, and several other officers, went to visit the farms of Bouix, Vadenay, Cuperly Suippes, and Joachery, which had been formed within the last four months by his orders. He expressed great satisfaction at the rapidity with which all the works had been executed. In addition to the barns and buildings for the accommodation of the persons engaged on these farms, each of the establishments has sheds for 100 cows and 1,200 sheep, and stabling for 20 horses; and already 400 cows of the Breton, German, and Swiss breeds, more than 3,000 sheep, with a number of English rams, and 30 fine breeding mares have been collected there. Five other similar farms have been planned out, and will be completed in 1859. The establishment of these farms will be of great benefit to the country, by transforming land which has been hitherto waste into productive property.—*English Paper.*

FLOWERS OF THE OLDEN TIME.—The floral beauties of Britain were confined to those wild flowers which are to-day the delight of childhood. The eyes of the "barbarians" looked upon the modest daisy, which then presented the same simple form that it does to-day. Prim-roses, nursed in the recesses of gnarled roots of trees, came forth in abundance in the spring; so did the blue-bell and the violet. These familiar flowers, with dog-roses, foxgloves, traveller's-joy, flowering heaths, and water-lilies, were the chief beauties of the bouquet of the ancient Briton. Fuchsias, balsams, dahlias, auriculas, hyacinths, pinks, tulips, roses, and a host of other beauties that now adorn our gardens and dwellings, were then quite unknown. Even the wall-flower and the mignonette were strangers to our land; and the honeysuckle, which is now a common inhabitant of the hedges, came to Britain a stranger, and stole out of the confines of a garden, to share the fortunes of our native wild flowers. Nor was the state of the British flora peculiar to the earliest period. It prevailed, with only slight additions and improvements, down to the sixteenth century!—*Phelp's Progress of Agriculture.*

Life of an Oyster.—But the life of a shell-fish is not one of unvarying rest. Observe the phases of an individual oyster from the moment of its earliest embryo life, independent of maternal ties, to the consummation of its destiny, when the knife of fate shall sever its muscular cords and doom it to entombment in a living sepulchre. How starts it forth into the world of waters? Not, as unenlightened people believe, in the shape of a minute, bivalved, protected, grave, fixed, and steady oysterling. No; it enters upon its career all life and motion, flitting about in the sea as gayly and lightly as a butterfly or a swallow skims through the air. Its first appearance is as a microscopic oyster cherub, with wing-like lobes flanking a mouth and shoulders, unincumbered with inferior crural prolongations. It passes through a joyous and vivacious juvenility, skipping up and down as if in mockery of its heavy and immovable parents. It voyages from oyster-bed to oyster-bed, and if in luck so as to escape the watchful voracity of the thousand enemies that lie in wait or prowl about to prey upon youth and inexperience, at length, having sowed its wild oats, settles down into a steady, solid, domestic oyster. It becomes the parent of fresh broods of oyster cherubs. As such it would live and die, leaving its shell, thickened through old age, to serve as its monument throughout all time—a contribution towards the construction of a fresh geological epoch, and a new layer of the earth's crust—were it not for the gluttony of man, who, rending this sober citizen of the sea from his native bed, carries him unresisting to busy cities, and the hum of crowds. If a handsome, well-shaped and well-flavored oyster, he is introduced to the palaces of the rich and noble, like a wit, or a philosopher, or a poet, to give additional relish to their sumptuous feats; if a sturdy, thick-backed, strong-tasted individual, fate consigns him to the capacious tub of the street fishmonger, from whence, dosed with course black pepper and pungent vinegar, embalmed partly after the fashion of an Egyptian King, he is transferred to the hungry stomach of a costermonger, or becomes the luxurious repast of a successful pickpocket.—*Westminster Review.*

Spontaneous Fermentation.—Dough, as it contains both gluten and sugar, when moistened, is capable of fermentation without adding another substance. If simple flour and water be mixed and set aside in a warm place, after the lapse of several hours it will exhibit symptoms of internal chemical action, becoming sour from the formation of lactic acid, while minute bubbles appear, which are owing to a gas set free within the dough. These changes are irregular and uncertain, according to the proportion and condition of the constituents of the flour. They also proceed with greater or less rapidity at the surface or in the interior, according as the parts are exposed to the cooling and oxidating influence of the air. Bread baked from such dough, is sour, heavy, and altogether bad. Yet the true vinous fermentation may be spontaneously established in the dough by taking measures to quicken the action. If a small portion of flour and water be thus mixed to the consistency of batter, (its half fluid state being favorable to a rapid chemical change) and the mixture be placed in a jar or pitcher, and set in a vessel of water kept at a temperature from 100 to 110 degrees, in the course of five or six nours decomposition will have set in with a copious production of gas bubbles, which may be seen by the appearance of the batter when stirred. If this is mixed and kneaded with a large mass of dough, moulded into loaves and set aside for an hour or two in a warm place, the dough will swell or "rise" to a much larger bulk; and, when baked, will yield a light, spongy bread. A little salt is usually added at first, which promotes the fermentation, and hence bread raised in this manner is called "self raised bread." Milk is often used for mixing the flour, instead of water; the product is then called "milk emptyings bread."—*Yeomans.*

AGRICULTURAL COMMERCE OF OHIO.—In 1855 the state sent twenty-three thousand head of cattle to New York City, and in 1857, 50,000 head, besides some 15,000 sent to Philadelphia, and many to Baltimore. At least 70,000 head of cattle were sent to these three cities in 1857. The hog trade is far greater; and notwithstanding that the number of live and dressed hogs exported from the state has, in the past few years, increased rapidly, the numbers packed at Cincinnati have not declined. According to the Annual Report of the Commissioner of Statistics, just published, the aggregate value of farm produce is $132,700,000, and the net profits $57,300,000. The price of wood varies from $7.60 to $2.75 per cord, and is highest in counties through which main lines of railway pass, on account of the vast quantities of wood consumed by the locomotives. These roads consume annually the product of twelve thousand acres of land. Farm labor is uniformly high, the average wages being fifteen dollars per month and board. This is owing to the growth of towns and manufactures, which steadily causes the agricultural supply to diminish, so that large farmers are only able to secure their crops by the use of machinery.

LOOKING GLASSES.—The manufacture of silvered mirrors, as at present carried on, is one of the most curious of modern arts. The process of thus silvering glass mirrors is very simple. The sheet of tin-foil, somewhat larger than the mirror, is laid upon a smooth table, and quicksilver poured over it until it covers the tin-foil with a thickness of one-tenth of an inch or more; when the mercury has been swept by the edge of a stick to clean off the drops from its surface, the glass plate, scrupulously clean, is brought even with the edge of the table, and pushed gently forward sideways, so as to slide over the bath of mercury, its edge just dipping beneath its surface, so as to push before it all impurities, and to exclude all air-bubbles. Weights are then evenly applied over the back of the mirror, and the whole table inclined to such an angle as to favor the drawing off of the superfluous mercury. This requires some days or weeks, according to the size of the plate. Here is an additional risk and cost in large mirrors, since the time consumed is not small, and the danger of fracture imminent. The amalgam sometimes crystallizes, producing imperceptions which require the renewal of the whole process; and the health of those engaged in it also suffers, and is finally destroyed by mercurial salivation.—*Life Illustrated.*

"WITCHCRAFT" AND AGRICULTURE.—Pliny has recorded the story of an industrious and ingenious husbandman, who, being in advance of the knowledge of his time, cultivated a small piece of ground upon an improved method, by which he gathered much more fruits, and reaped larger profits than the neighbors about them, though their possessions were more ample. His uncommon success excited their envy, insomuch that they brought this accusation against him: "That by sorcery, charms, and witchcraft, he had transported his neighbors' fruits, fertility, and increase to his own fields." For this he was ordered peremptorily, by Albinus, a Roman general skilled in agriculture, to answer the charge before him. Cresinus, fearing the issue, resolved upon his best defence, brought his plough and other rural implements, and displaying them openly, he set there also his daughter, a lusty, strong lass, big of bone; then, turning to the citizens—"My masters," quoth he, "these are the sorceries, charms, and all the enchantments that I use. I might also allege my own travel and labor, my early rising and late sitting up, and the painful sweat that I daily endure; but I am not able to present these to your view, nor to bring them with me into this assembly." This bold and open defence capti-

vated the people; it proved the *coup de main* which turned a doubtful result to his entire favor; he was pronounced "not guilty," and those present took note of his inventions. This story, though not strictly belonging to the history of our own island, is derived from those who are said to have first taught the Britons the art of husbandry. It may, therefore, be fairly employed to show that the first improvers of agriculture had their days of trial; that in all ages and countries, and in every path of inquiry and invention—in the discovery of the rotation of crops, as in that of the rotary motion of the earth—a Galileo has had to answer for his daring, before some embodiment of ignorance constituting an inquisition.—*Ibid.*

Extent of the Roman Empire.—We are sometimes under a little delusion in the estimates we form of the magnificence of the Roman Empire, or the multitude of troops that it maintained. Russia surpasses it in extent of territory, and maintains an army considerably more numerous. France and Austria, who rank next to Russia in the number of their standing armies, could singly bring into the field a much larger force than the whole Roman Empire. The military force of the Pagan Empire is here estimated at 450,000 men; the Christian monarchies of France and Austria are each of them reputed to maintain an army of 650,000 men. And when we reflect upon the invention of gunpowder and the enormous force of artillery, it is evident that any one of the first rate powers of modern Europe could bring into the field a destructive force that would sweep from the face of the earth the thirty legions of Adrian. The very division of Europe into a number of States involves this increase of soldiery. In the old Roman Empire the great Mediterranean sea lay peaceful as a lake, and the Roman ships had nothing to dread but the wind and the waves; whereas, in modern Europe many artificial boundaries have to be guarded by an array of soldiers. "Belgium defends her flats with a hundred thousand men, and the marshes of Holland are secured by sixty thousand Dutch." Hitherto everything has tended to develop the military power in Christendom.—*White's Eighteen Centuries.*

Of Regimen of Health.—There is a wisdom in this beyond the rules of physic; a man's own observation what he finds good of, and what he finds hurt of, is the best physic to preserve health; but it is a safer conclusion to say, "This agreeth not well with me, therefore I will not continue it," than this: "I find no offence of this, therefore I may use it;" for strength of youth in nature passeth over many excesses which are owing a man till his age. Discern of the coming on of years, and think not to do the same things still; for age will not be defied. Beware of sudden change in any great point of diet, and, if necessary, enforce it, fit the rest to it; for it is a secret both in nature and state, that it is safer to change many things than one. Examine the customs of diet, sleep, exercise, apparel, and the like; and try, in anything thou shalt judge hurtful, to discontinue it by little and little; but so, as if thou dost find any inconvenience by the change, thou come back to it again; for it is hard to distinguish that which is generally held good and wholesome, from that which is good particularly, and fit for thine own body. To be free-minded and cheerfully disposed at hours of meat, and of sleep, and of exercise, is one of the best precepts of long lasting. As for the passions and studies of the mind, avoid envy, envious fears, anger, fretting inwards, subtle and knotty inquisitions, joys and exhilarations in excess, sadness, not communicated. Entertain hopes; mirth rather than joy; variety of delights rather than surfeit of them; wonder and admiration, and therefore novelties; studies that fill the mind with splendid and illustrious objects, as histories, fables, and contemplations of nature. —*Lord Bacon.*

Rancid Butter.—The Echodu Monde Savant says: "A farmer in the vicinity of Brussels, having been successful in removing the bad smell and taste of some butter by mixing it with chloride of lime, he was encouraged by this experiment, and he has restored to butter, the taste and odor of which were insupportable, all the sweetness of fresh butter. The operation is extremely simple, and practicable by all. It consists simply in working the butter in a sufficient quantity of water, in which 25 to 30 drops of chloride of lime have been added to every two pounds of butter After having mixed it till all its parts are in contact with the water it may be left in it for an hour or two, afterwards withdrawn and worked again in clear water. The chloride of lime having nothing injurious in it, can with safety be augmented; but after having varied the experiment, it was found that twenty-five to thirty drops to every two pounds of butter were sufficient. Another method of restoring sweetness and flavor to rancid butter, said to be very effectual by those who have tried it, is to put it into a churn with new milk and work it till the old salt and rancidity is removed, after which it is to be taken from the churn, worked and salted afresh.—*N. E. Cultivator.*

Dog Hounds.—Theirs is the sort of form which expresses to me what I want to express—nature not limited, but developed by high civilization. The old savage ideal of beauty was the lion, type of mere massive force. That was succeeded by an over-civilized ideal, say the fawn, type of delicate grace. By cunning breeding and choosing, through long centuries, man has combined both, and has created the foxhound, lion, and fawn in one. Look at that old hound, who stands doubtful, looking up at his master for advice. Look at the severity, delicacy, lightness of every curve. His head is finer than a deer's; his hind legs tense as steel springs; his fore-legs straight as arrows; and yet see the depth of chest, the sweep of loin, the breadth of paw, the mass of arm and thigh; and, if you have an eye for form, look at the absolute majesty of his attitude at this moment. Majesty is the only word for it. If he were six feet high, instead of twenty-three inches, with what animal on earth could you compare him? Is it not joy to see such a thing alive? It is to me, at least. I would like to have one in my study all day long, as I would have a statue or a picture; and when Mr. Morrell gave (as they say) two hundred guineas for Hercules alone, I believe the dog was well worth the money, only to look at.—*Rev. Charles Kingsley.*

Scientific Paradoxes.—The water which drowns us, a fluent stream, can be walked upon as ice. The bullet, which, when fired from the musket, carries death, will be harmless, if ground to dust before being fired. The crystallized part of the oil of roses, so grateful in its fragrance—a solid at ordinary temperatures though readily volatile—is a compound substance, containing exactly the same elements, and in exactly the same proportions, as the gas with which we light our streets. The tea which we daily drink, with benefit and pleasure, produces palpitations, nervous tremblings, and even paralysis, if taken in excess; yet the peculiar organic agent called theine, to which tea owes its qualities, may be taken by itself, (as theine, not as tea) without any appreciable effect. The water which will allay our burning thirst augments it when congealed into snow; so that Captain Ross declares the natives of Arctic regions "prefer enduring the utmost extremity of thirst rather than attempt to remove it by eating snow." Yet if the snow be melted it becomes drinkable water. Nevertheless, although, if melted before entering the mouth, it assuages thirst like other water, when melted in the mouth it has the opposite effect. To render this paradox more striking, we have only to remember that ice, which melts more slowly in the mouth, is very inefficient for allaying thirst.—*Blackwood's Magazine.*

Unwritten Songs.—Anywhere by some fringed stream in New York woods, or under the shadow of a New England mountain, or even here away in the leafy edges of Indiana or Michigan. But he must needs to get up before breakfast; it is the *matins* he must have performed in that hour of gold, silver and pearl, between the dawn and the sunrise. The blue-bird and the robin, the bobolink and the thrush; the mocking-bird, the martin and the sparrow, all these, and "ever so many more," fill the morning and the heart with melody. But with the first flash of sun, the ecstacy subsides, and the grand anthem is ended.

Very few, we imagine, have ever heard this gush of song. Duty may rouse them, or pain forbid sleep, but they were not *charmed* awake. There is a startling beauty in that concert; the listener can not be done wondering at the volume of sweet sound there is in a single grove; the variety of the tones, and the marvellous harmony of the whole.

Beginning gradually with a warble in the grass or a note in the trees, it rapidly multiplies and deepens and extends, until every leafy bough conceals a singer, while the east is slowly brightening. With the first deep crimson and golden glow, the enthusiasm culminates, and the swelling wave of song subsides. And when the lazy World and his wife yawn their way to breakfast, they pause at the window, and while the robin holds on in its sweet old story, and the sparrow chirps a solo, they say, "how charmingly the birds do sing!" not dreaming, luxurious souls, that the concert was all over before their last dream began.—*B. F. Taylor.*

Microscopic Wonders.—Among the most remarkable of those myriads of animals which exist in every drop of water, is the navicula—a little creature which has some twenty or thirty legs, and is endowed by Nature with an armor of flint. In a paper which was recently laid before one of the scientific societies of London, some curious facts concerning this diminutive animal were stated. Among other things it was mentioned that if an observer watches narrowly for five or six hours, he will note a thin transparent line spreading across it in some direction. After the line makes its first appearance it becomes every moment more distinct, and rapidly increases in width. At length the creature begins wiggling its limbs violently, the body splits asunder, and two new naviculas are made out of one old one. The animal has something like a hundred stomachs, and its mouth, which is situated near one extremity, is surrounded by a number of almost invisible tentacula, with which it grasps its food; but as soon as the transparent line appears, which denotes its approaching division into two, as another mouth will be wanted another is seen sprouting from the other extremity, and is ready to perform its functions as soon as the separation is effected. The navicula divides itself in two, once in twelve hours, under ordinary circumstances. But there are some kinds of naviculæ which split themselves into sixteen instead of two in the same space of time. Were there no checks to the increase, a single one of the tribe would become the producer of hundreds of millions of creatures in a month.—*Portfolio.*

Our Changing Climate.—The following beautiful passage by Washington Irving, might almost make a March day cheerful:—

"Here let us say a word in favor of those vicisitudes of our climate, which are too often made the subject of exclusive repining. If they annoy us occasionally by changes from hot to cold, from wet to dry, they give us one of the most beautiful climates in the world. They give us the brilliant sunshine of the South of Europe, with the fresh verdure of the North. They float our summer sky with gorgeous tints of fleecy whiteness, and send down cooling showers to refresh the panting earth and keep it green. Our seasons

are full of sublimity and beauty. Winter with us hath none of its proverbial gloom. It may have its howling winds and chilling frosts, and whirling snow storms; but it has also its long intervals of cloudless sunshine, when the snow clad earth gives redoubled brightness to the day, when at night the stars beam with intensest lustre, or the moon floods the whole landscape with her most limpid radiance. And the joyous outbreak of our Spring, bursting at once into leaf and blossom, redundant with vegetation, and vociferous with life and the splendor of summer—its morning voluptuousness and evening glory—its airy palaces of sunlight clouds piled up in a deep azure sky; and its gusts of tempests of almost tropical grandeur, when the forked lightning and bellowing thunder-volley from the battlements of heaven shake the sultry atmosphere; and the sublime melancholy of our Autumn, magnificent in its decay, withering down the pomp of a woodland country, yet reflecting back from its yellow forests the golden serenity of the sky. Truly we may say that in our climate, 'The heavens declare the glory of God, and the firmanent showeth his handiwork. Day unto day uttereth speech, and night unto night showeth knowledge."

Watering Sheep in Winter.—That Sheep can do with less water than other domestic animals, is well known. That they should be *forced* to do with a less quantity than they desire, or compelled to do without any, except what is accidently supplied by melting snow or rain, no reasonable or merciful man can believe for one moment. In some experiments on South Down Sheep, at Rothamstead, we found that in the summer months each sheep eat 3 lbs. of clover hay, and drank about 6 lbs. of water daily. Thinking that they drank more than was favorable for the deposition of fat, we confined them to a less quantity of water for one week. The result was that during that time they eat less food and *lost weight*. This result satisfied us that sheep knew better than man, though he were scientific, how much water they required. But we need not quote experiments. The common sense of every man tells him that sheep, as well as all other animals, should be abundantly supplied with fresh water. Cows and sheep, if possible, should have free access to it *at all times*. For, unlike the horse, they will not always drink at stated times, however regularly observed. A well, pump, and troughs would seem, therefore, to be necessary appendages to every well managed barnyard or sheep fold. Kind reader, *act* on this matter, and your sheep and cows will bless you, if not in words, at least in wool, milk and profit.—*Genesee Farmer.*

The Waste of Woollen Mills.—The *Dumfries Courier* describes a process now in operation at the Kingholm Woollen Mills, near Dumfries, by which the hitherto refuse water of the washing-houses is converted into valuable commercial material. By means of mechanical appliances and chemical action, the refuse, formerly turned into the River Nith, to the injury of the salmon, is made to produce stearine, which forms the basis of composite candles, as well as a cake manure that sells at 40s per ton.

Common Plants.—A recent writer well observes: "There is nothing too common, or betokening stinginess or poverty, in having the oldest or simplest plant well-grown and bloomed in a pot; everybody loves to see them. Look at the hanging plants in the Crystal Palace, and say if you ever saw so many of the very commonest plants put together before. Not one of them but the poorest man in the next village might have in his window, and yet everybody admires them. It is only that fashion requires the rich to have more costly plants, but surely there is no reason why you and I should be so foolish as to hanker after guinea plants, which are not a bit better for being dearer."

SPREAD OF THE ENGLISH LANGUAGE.—"The spread of the English language, says a document of the London Tract Society, "is a remarkable fact in the providential dealings of the Most High with mankind. Its study is increasing all over Europe. It is the mother tongue of the United States, as well as of the British Isles, and prevails over the whole of the vast colonies of North America appended to the British crown. It is the language of many of the West India Islands, and is heard more or less in all the centres of commercial activity in South America. It is the tongue of the infant empires of Australia, Van Diemen's Land, and New Zealand, and appears destined to overspread the whole Polynesian Island groups. From the Cape it is moving upwards into the interior of Africa, and into whatever part Dr. Livingston pierces from the west, he will take with him not only the merchandise but the speech of his country. Along the Egyptian highway to Asia it is becoming a familiar sound. Throughout all India, from Cape Comorin to the Himalayas, it is being acquired by the most active and influential of the native population; and in five of the crowded ports of China it is one of the dialects of every-day life. Wherever the English tongue is spoken its literature finds its way. Hence it is no exaggeration to say that the preparation of a Christian literature in the English language is an object of world-wide importance."

DEATH OF A NOTED HORSE.—The celebrated trotting horse Ned Forest, who at one time was the acknowledged champion of the turf, died on the 13th of October, at the stable of James Hamill, N. Y., at the advanced age of thirty-four years. This extraordinary horse, son of Grand Bashaw, was once the property of Gen. George Cadwallader, of Philadelphia, and it is said, while in his possession, trotted repeatedly half a mile in 1.08 and 1.09; and that on a private trial he performed his mile in harness in 2.26.

THE ENGLISH CHRISTMAS HOME.

BY ELIZA COOK.

A loud and laughing welcome to the merry Christmas bells!
All hail, with happy gladness, to the well known chaunt that swells.
We list the pealing anthem chord, we hear the midnight strain,
And love the tidings that proclaim old Christmas once again.
But there must be a melody of purer, deeper sound,
A rich key-note, whose echo runs through all the music round;
Let kindly voices ring beneath low roof or palace dome,
For these alone are carol chimes that bless a Christmas Home!

CHORUS.

Then fill once more from Bounty's store red wine or nut-brown foam,
And drink to kindly voices in an English Christmas Home.

A blythe and joyous welcome to the berries and the leaves
That hang about our household-walls in dark and rustling sheaves;
Up with the holly and the bay, set laurel on the board,
And let the mistletoe look down while pledging draughts are poured.
But there must be some hallowed bloom to garland with the rest—
All, all, must bring towards the wreath some flowrets in the breast;
For though green boughs may thickly grace low roof or palace dome,
Warm hearts alone will truly serve to deck the Christmas Home!

CHORUS.

Then fill once more from Bounty's store red wine or nut-brown foam
And drink to honest hearts within an English Christmas Home!

EUROPEAN ANIMALS IN AUSTRALIA.

The extended introduction of useful animals into our Colonial possessions, occupies, we are glad to perceive, a large share of public attention, and will, we hope, lead to ultimate beneficial results.

The columns of the *Times*, which are usually available during the Parliamentary recess for the discussion of topics of social and general interest, have recently been made use of by Mr. Edward Wilson, of Melbourne, who, in a very sensible letter, brings prominently forward the importance of the introduction and diffusion of European animals over the Australian continent and islands. Without following Mr. Wilson in the poetry of his subject, when he inquires, "Why should the heart of our ploughmen not be gladdened by the song of the skylark? and why should the daughter of Australia, as she lingers with her lover upon a moonlight evening, be deprived of one more felicity, one more topic of conversation, in the nightingale perched in the neighboring thicket?" we may confine ourselves to the utilitarian and practical point of view.

When we see what has already been done in Australia for the comfort and sustenance of man, there is ample encouragement for further spirited exertion. The country, soil, and climate are highly favorable to the spread and support of living creatures.—"It is but the other day," remarks Mr. Wilson, "that we got the sheep; yet we already supply Great Britain with the chief portion of her finer wools. The first cow was imported within the memory of living man; and now vast herds roam over millions of acres, from Wide Bay to South Australia, and good judges are beginning to ask whether the colonial cattle will not bear a favorable comparison with the English average. We have got the horse, unrivalled in the whole world for his powers of endurance; for were the deeds of our grass-fed stock-horses but whispered within your well-kept English stables, the narrative would be roared down by a general chorus of incredulous horse laughter. The 'time' of our races would compare not very unfavorably with your own. And thus, with the dog, cat, pig, domestic fowl, duck, rabbit, pigeon, down to our old friends the common house rat and mouse, which with their own amusing pertinacity, stick by us with a fidelity worthy of a better cause, and multiplying exceedingly among us, give a home aspect to our colonial houses in their own ingenious and significant style."

The demand for mutton, beef and pork will lead to improved breeds of these live stock. Poultry, which have been little attended to, will greatly increase, in order to keep pace with the demand. Turkeys, we perceive, are fetching 25s., geese 10s. to 12s, ducks 6s., and fowls 5s. a-head in the Melbourne market. Dairy produce is also brought to market on a very limited scale, or such prices as these would not be realized in an old colony—fresh butter 3s. 6d. a pound, milk 1s. a quart, and eggs 3s. 6d. a dozen. All the cheese consumed, is also imported. The absence of good roads, and the expense of transport from distant farms to the town, has, doubtless, had something to do with prices and supply. But the extension of railways and common roads, the water communication by steam on the Murray river, and other tributary streams now available, will greatly facilitate the forwarding of dairy produce to the market, both to Adelaide and Melbourne.

In the matter of horses, of which Mr. Wilson speaks so favorably, the demand for them for India, and increased local wants which population brings with it, will lead to great extension of horse-breeding.

It appears that the flock of alpacas for Victoria are to be sent out in the Goddess, which will sail in a few days. They are under the charge of a competent attendant, obtained from the Zoological Gardens. There is no doubt other introductions of new animals will follow. The Angora, or Thibet goat, which the Cape colonists and South Australians are now trying to acclimatize, should also be introduced into Victoria.—We pointed out a few months ago the great importance of these efforts for the future of Australia. It is a great disgrace that the camel has never yet been introduced into Australia. What an admirable beast of burthen it would prove for the use of the explorer in the interior deserts, which have hitherto proved so fatal a barrier to progress and communication across the Continent! The animal could be obtained very cheaply in Algeria, Tunis, or by the way of the Red Sea. The colony of Victoria has ample funds at disposal; and what a benefit would a thousand pounds or two be, laid out for such a purpose, conjointly with the colony of South Australia, on public

grounds, for the introduction of the camel, especially for exploring purposes! We should then not imperil the lives of those bold explorers who go forth to trace out the unknown parts of that great island-continent, destined to play hereafter a prominent part in the roll of history, and whose coasts are now being rapidly filled up with population, while sheep and cattle are depastured by millions over its widely-extended plains.

Other suggestions are thrown out by Mr. Wilson deserving notice; and certainly there is no reason why the table of the colonist should not be supplied with an occasional hare or pheasant, or why the alderman of the antipodes should not have his salmon cutlet, or his slice of venison, as well as his English *confrere*. The introduction of game-birds has not yet been very successful; but then the attempts made have been only partial, and on a limited scale. It is of no use to turn adrift a dozen pheasants in the woods, and to call that trying an experiment, in the proper acceptation of the term. The game of Australia is at present very limited, and getting more so, as the natives depend entirely upon them for their support. Kangaroo tail soup is not bad; and the popular colonial dish called a "steamer," which it furnishes, is well known. The flesh of the wombat, the bandicoot, and even of the opossum, may do for the bushman. The flesh of the emu is passably good; but this bird, the kangaroo, and the other native animals, are becoming rare as settlement advances, a war of extermination seeming to have been declared against them.

It is satisfactory to find that a zoological society has been formed at Melbourne, which has received from the Government a valuable tract of land, and a grant of £3,000, for the introduction of new animals.

Besides the broad question of interest and profit to be gained by individuals in this movement, we heartily concur in the desire "to see the good things of the earth spread as rapidly as possible over every portion of its surface, and to find every reasonable effort made to multiply, as far as can be, the legitimate enjoyments of mankind."—*Mark Lane Express.*

PROFESSIONAL TERMS IN STOCK-BREEDING.

Columbella asks me to define what I understand by the term "breed" as applied to the propagation of live stock; and at the same time he gives the following definition of the word as he understands it:—

"A recent variety made up by crossing and mingling the blood of two or more races, thus producing what is called a hybrid, a mule, a cross, a grade, of a peculiar type, like the Ayrshire, which was unknown until within a few years, and whose tendency is to return to its native elements or run out."

This definition of the origin of a *breed* of live stock, and of the meaning of the word, strikes me as being singularly defective and faulty. It is true that a new breed may originate in a cross or grade, but not necessarily in either. To each of the words race, breed, hybrid, cross, and grade, the writer attaches separate and distinct meaning, which is something like the following: A *race* is a large division of a species which is always produced by nature. A *breed* is always the product of domestication and breeding, operating on the natural susceptibilities of every race and species. It is therefore the work of art. A *hybrid* is always the offspring of parents whose sexes belong to different species, as a mule, which is the product of the mingled blood of the ass and horse. A *cross* is never a hybrid, but always the offspring of sexes belonging to different breeds or different races of the same species. A *grade* is the offspring, not of different breeds or races, but of a breed which possesses pure or comparatively pure blood, and of the impure blood of a common herd. The grade is higher or lower, according to the amount of pure blood in the veins of the offspring.

Like the white inhabitants of the Caucasian race of Europe, its domesticated neat cattle all belong to one race. To attempt to divide the Caucasian race of the human species into sub-races, would obviously lead to confusion of terms, and a worthless nomenclature, which all sensible writers on the subject will be careful to avoid. Precisely the same objections exist to the multiplication of races in treating of neat cattle and of other domestic animals. The small hump-backed cattle of the Ganges and Central Asia, whose hides are often sent to this country under the name of "Calcutta

skins," are regarded as a race distinct from the common cattle of Europe, and yet they belong to the same species. Nature, under the local influences of a different continent, has developed, independently of all domestication and art, a different race of the bovine species. But all history relating to the matter, goes to prove that the Devons and Herefords have become what they are, by long culture and care in *breeding;* and they are, therefore, truly breeds all over, inside and out. Indeed, whatever of peculiar value they may possess for breeding purposes, is due to the length of time and thoroughness with which and in which these breeds have been propagated. As a race, or as races, they have not a particle more claim to distinction than they have as a species. Possibly they were favorite breeds before the flood; and while Noah selected the beautiful Devons for their purity of blood, his oldest son may have had the taste of Mr. William Sotham, and preferred the white-faced Herefords, so that both breeds were preserved in the Ark. At all events, I doubt whether they could find more quiet domestic animals among all their live stock. Gentle blood, whether in the veins of a *gentle* man, or of a gentle Arabian horse, has been purified by many generations of good breeding. It is mainly this social advancement among the higher orders of animals, which renders base, blood undesirable, or pure blood an object of interest in the most civilized nations. "Blood will tell;" and for this reason all its elements deserve the closest study of every farmer, and of every person, no matter what may be his or her condition or pursuit in life.

Columella is entirely right in insisting on the natural obstacles to be overcome in establishing a new and really valuable breed, whether Short Horns, Ayrshires, or any other products of human skill. There is ever a strong tendency "to cry back" in the young of every race; for nature is ever true to herself, her instincts, and her offspring. When they seem inclined to depart too far from her ways, she renders them impotent like the mule, or cuts them off by death. Nevertheless, the plasticity of animal and vegetable vitality is very considerable, and presents to the intelligent husbandman a wide and fertile field for improvement. To change the constitution and habits of living beings, whether animals or plants, for the better, involves the consideration of some of the profoundest principles of philosophy and science. It is this fact that gives to agriculture its dignity as a learned profession. I want to see it more and better cultivated in all its varied and useful departments; and it was to draw out Columella, and make him share with me and the public the rich fruits of his reading and experience, that I ventured to criticise what he said on the subject of breeds and races. Cato.—*Country Gentleman.*

Singular Hare Hunting.—Some time since, as Mr. Clarke, of Horndean, was going a few miles on foot, in the forest of Bere, to visit a friend, he observed a hare come into the green road before him, which seemed to be listening, and looking back for something which pursued her. He stood still, and hearing no dog, was curious to discover the cause of her alarm; when to his great surprise, he discovered the object of it to be a small yellow-red and white stoat, (a species of a weasel,) which hunted her footsteps with the utmost precision. He, wishing to know if so diminutive an animal could have a chance of coping with the great speed of the hare, retreated to a holm-bush hard by, where he was an attentive observer of this silent hunt for nearly two hours, during which he is certain to have seen both hare and stoat at least forty times. They were frequently gone for five or ten minutes; but the hare still unwilling to leave the place where she was found, came round again, and her little pursuer sometimes close at her heels. Towards the end of this remarkable chase, which became uncommonly interesting, the hare took advantage of the thickest covert the place afforded, and made use of all her cunning and strength to escape, but without effect; till at length, wearied out by the perseverance of the stoat, Mr. C. heard her cry for some time. At last, the cries coming from one point, he concluded she was become the victim of the chase; on which he went to the spot, where he found the hare quite dead, and the stoat so intently fastened on her neck, as not to perceive his approach.—The stoat, in its turn, now fell a victim to Mr. C's stick; after which he proceeded, with both hare and stoat to the house of his friend.—*London Sportsman.*